Flow

THE MAGAZINE OF MODERN MATERIAL HANDLING AND PACKAGING METHODS

NOVEMBER
1948

MAKE YOUR PLANS NOW
for
The Third
National Material Handling Exposition

IN THIS ISSUE:

Take a Tip— buy a ZIP!

P&H

ZIP-LIFT

HARNISCHFEGER CORP. MILWAUKEE, WIS.

WHY settle for anything less? The Zip-Lift is the real wire rope electric hoist — with full magnetic push-button control — and the top-notch qualities you'd expect only in the most expensive hoisting equipment.

If you have heavy loads (anything up to 2,000 lbs.) you can't lose with a Zip-Lift. It starts earning the moment you hang it up on hook, jib or trolley — pays for itself several times a year. Why postpone the savings it brings you? Add a new Zip to your production — now!

Ask for your copy of Bulletin H20-3. It covers everything you want to know about the P&H Zip-Lift — applications, pictures, specifications, etc.

These are Added Values!

SAFER—Control current is reduced to 110 volts at the push-button. Crane type limit switch and double brakes provide maximum safety.

LIFETIME CONSTRUCTION — Shaved gears — grease-sealed bearings — precision construction — moisture-proof, dust-proof, acid-proof.

SMOOTHER OPERATION — Motor specifically built for hoist service — high starting torque, frequent reversal, etc. Controls loads within a fraction of an inch.

ALERT SERVICE — Out-of-stock delivery from qualified dealers everywhere — backed by 18 branch offices and 8 conveniently located warehouses.

The Zip-Lift is America's fastest selling wire rope hoist.

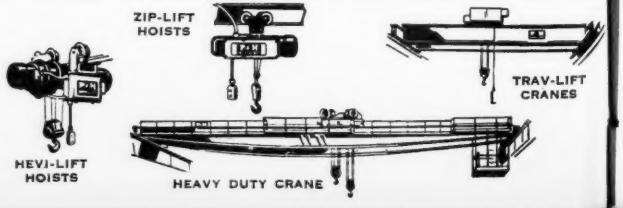
Handle it "thru-the-air" at lower cost

P&H ELECTRIC HOISTS

4643 West National Avenue
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

HOISTS · WELDING ELECTRODES · MOTORS · P&H · EXCAVATORS · ELECTRIC CRANES · ARC WELDERS



Amazing New Transrider Fork Truck Gives Large Truck Performance At Astounding Low Price!

Only Transrider gives you all these Material Handling Money-Saving Features

- ★ Rider operated
- ★ Drive on the load wheels
- ★ High pressure hydraulics
- ★ Automotive type controls, including foot brake and foot accelerator
- ★ Dead-man control
- ★ Full contactor control
- ★ Road clearance ample for boxcar loading and severe ramp conditions
- ★ Lifts, tilts, and drives simultaneously

Now, for the first time, Automatic makes available to industrial truck users the battery operated TRANSRIDER Unit, at a low initial investment, without sacrificing results.

Despite its reduced cost, the Transrider incorporates the most desirable features of the larger famous Skylift trucks, and at the same time, gives you the economical operation, inexpensive maintenance and established dependability of the Transporter series. Batteries are interchangeable with the Transporter series, and no new charging equipment is necessary.

With a telescopic lift mechanism, the Transrider raises load to 130 inches, with an overall height of only 83 inches for clearance through standard boxcar and factory doors. Single lift, before telescopic uprights are extended, is 66 inches.

The shortest of any truck of like capacity, Transrider is maneuverable in cramped working quarters. Carrying a 36-inch load, it can right-angle stack in nine-foot aisles. This means added storage space within present building capacities. Truck capacities range from 2000 pounds for 48-inch long load to 3000 pounds for a 28-inch load. Send coupon for complete facts.

3rd ★★★★ NATIONAL MATERIALS HANDLING EXPOSITION
PHILADELPHIA CONVENTION HALL JAN 10-14 1949

Transrider
A PRODUCT OF AUTOMATIC
Lightens LIFE'S LOADS

AUTOMATIC TRANSPORTATION COMPANY
DIVISION OF THE [illegible] & TOWNE MFG. CO.
141 West 87th Street, Dept. W-8, Chicago 20, Ill.
Please send me complete facts on the New Low-Priced TRANSRIDER FORK TRUCK.

Company Name.....
By.....*Position*.....
Street Address.....
City.....*Zone*.....*State*.....

MANUFACTURERS OF THE FAMOUS TRANSPORTERS, TRANSTACKERS AND SKYLIFT ELECTRIC TRUCKS

Flow

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FLOW EDITORIAL AND BUSINESS OFFICES—
HAROLD F. BEHM,
Business Manager
L. L. OPPENHEIM,
Cleveland 13, Ohio
Phone: Prospect 1251

NEW YORK OFFICE—
LEE HAAS
19 W. 44th Street
Room 412
New York 18, New York
Murray Hill 7-3420

CHICAGO OFFICE—
ROBERT E. McKENNA
64 E. Lake Street, Room 1013
Chicago 1, Illinois
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FRED FRISENFELDT
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CCA

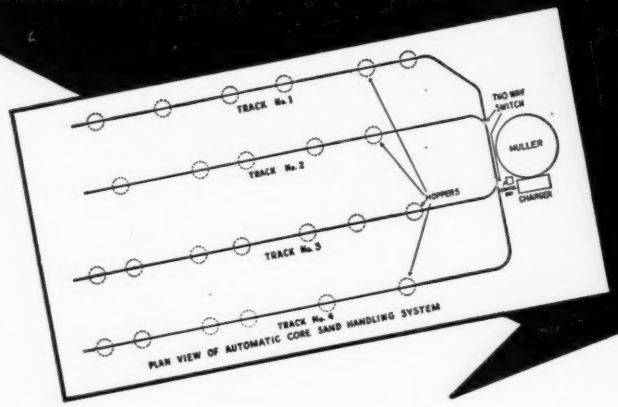
FEATURES

PACKAGING MECHANICS SECTION

DEPARTMENTS

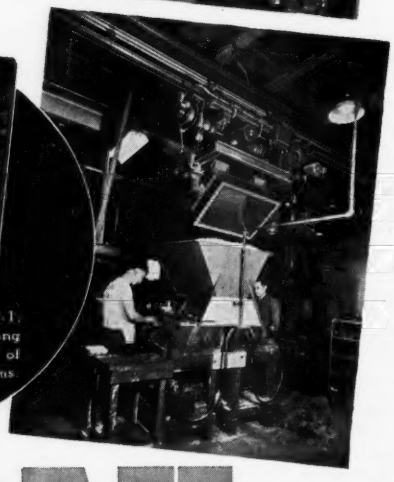
Automatic Dispatch System

delivers 25 tons of core sand per day!



PLAN VIEW OF AUTOMATIC CORE SAND HANDLING SYSTEM

This compact system requires only two men to keep 24 core benches supplied with fresh core sand. Charger receives sand from underground conveyor. Sand is loaded and automatically dispatched and dumped to any one of 24 stations, on four tracks, by push button control. Track switches are manually operated. Each track can be increased to 16 stations or 64 in all. This is another of the hundreds of American MonoRail installations that have cut handling costs. Let an American MonoRail engineer show you how it can be done in your business.

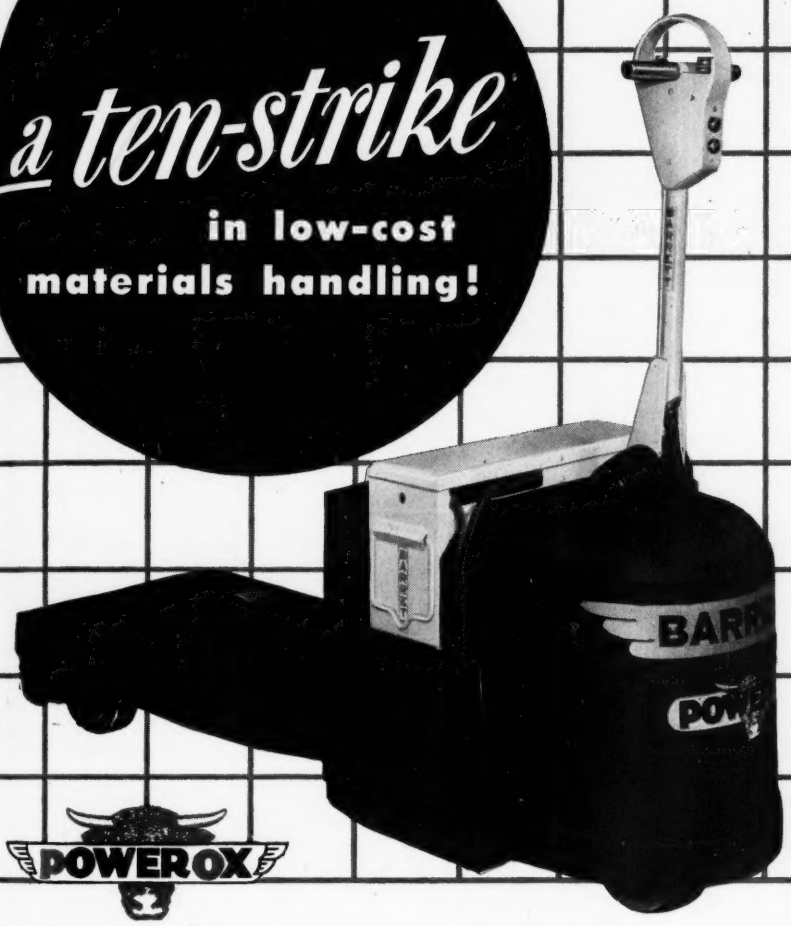


THE AMERICAN MONORAIL COMPANY

13129 ATHENS AVENUE CLEVELAND 7, OHIO

a ten-strike

in low-cost materials handling!



- **LOW COST** . . . an outstanding value
- **ELECTRIC DRIVE** . . . travels at walking speed
- **SMOOTH TRAVEL** . . . no speedups or lagging
- **ELECTRIC LIFT** . . . at the press of a button
- **QUICK LIFT** . . . 4 inches in 4 seconds
- **BIG CAPACITY** . . . your choice of two models—4,000 and 6,000 lbs.
- **HIGH FRAME CLEARANCE** . . . no snagging on inclines or uneven floors
- **EASY STEERING** . . . with full power through 270 degrees
- **SURE BRAKING** . . . with automatic, automotive brakes
- **SIMPLE OPERATION** . . . all motions push-button controlled

HERE are 10 big reasons why it pays you to lift and move loads electrically . . . with the Barrett PowerOx. Look over the other trucks in the field—and then compare them with what you get in a Barrett. No other truck can match the PowerOx—either in design, construction or operation!

With the PowerOx, you save time, money and labor. It enables *one man to do the work of 3 or 4!* This sturdy, dependable tool is cutting costs in hundreds of plants.

This same profit opportunity is open to you! Get the PowerOx story today. Ask to have a Barrett engineer call. He'll show you how the PowerOx can cut your costs—streamline your handling operations. Write . . .

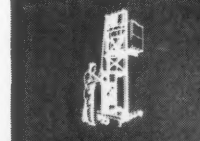
It's yours for the asking—The Barrett PowerOx Bulletin.

BARRETT-CRAVENS COMPANY
4619 South Western Blvd. • Chicago 9, Illinois
Representatives in All Principal Cities
Canadian Licensee: S. A. Armstrong, Ltd., Toronto, Canada

BARRETT

ONE MAN DOES MORE THAN 3 OR 4 . . . WITH A BARRETT

Barrett Handling Equipment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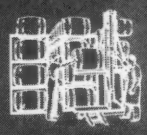
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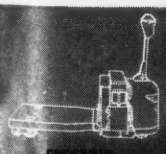
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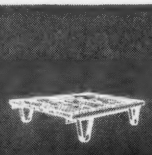

SKIDS


BARREL TRUCKS


NIFTY SYSTEMS

BOTH BUILD PROFITS!

MATERIAL HANDLING *News*

this CLARK team sure has EVERYTHING ...A most complete line with capacities from 1000 to 7000 lbs.... PLUS unbiased evaluation of individual needs.

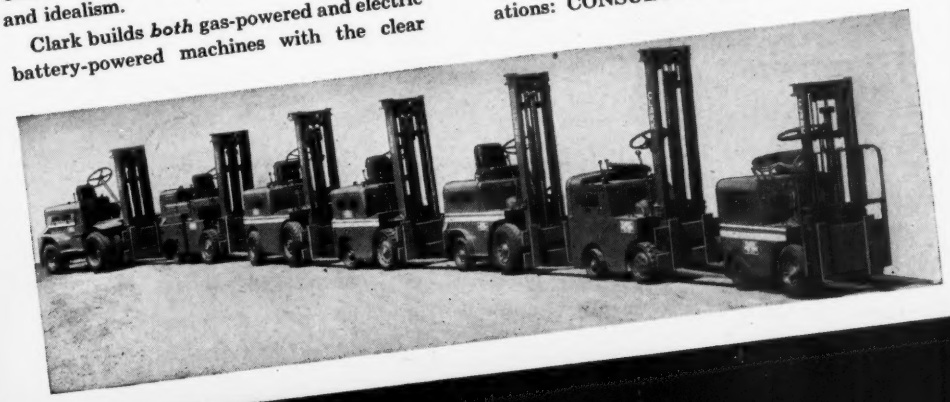
The truly vital element in any fabricated product is the idea back of it.

When Clark undertook some 30 years ago to build Materials Handling equipment, it was with the idea that it could evolve new and better handling methods and that it could produce for their implementation machines that would excel all others. That these objectives have long since been achieved and that they are maintained is demonstrated by Clark's leadership in the Materials Handling field. Furthermore, ***users*** endorse these products with enthusiasm and are quick to point out that they embody all the qualities that Industry has come to expect from Clark's unique experience, competence, skill and idealism.

Clark builds ***both*** gas-powered and electric battery-powered machines with the clear intent that each shall be the best of its kind. Insofar as possible, parts of the two power types are interchangeable for the sake of production economies which are passed along to the user in the form of lower initial cost and negligible maintenance costs. And practically all parts are manufactured in Clark's ***own*** plants to Clark's ***own*** exacting standards of quality and master workmanship.

To an analysis of Materials Handling operations, Clark brings complete objectivity because it is the producer of both power types. Its sole aim is to determine which type will serve more efficiently and more economically under conditions involved.

For a complete line that has EVERYTHING, and for dispassionate and unbiased counsel concerning Materials Handling operations: CONSULT CLARK.

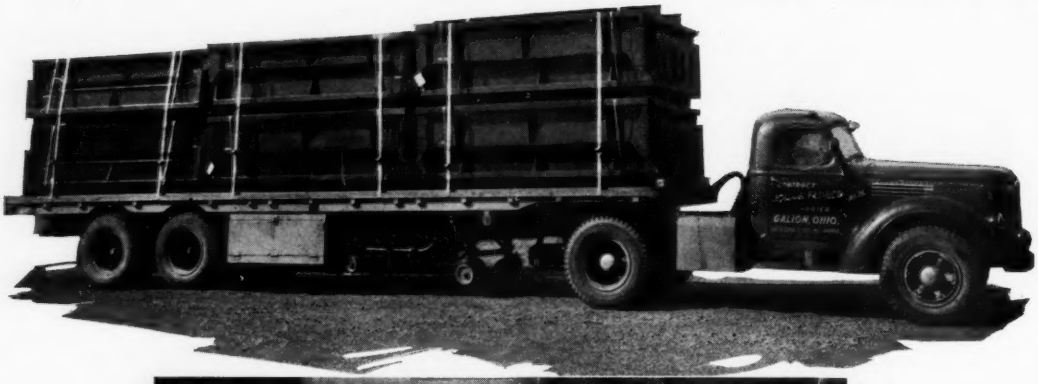


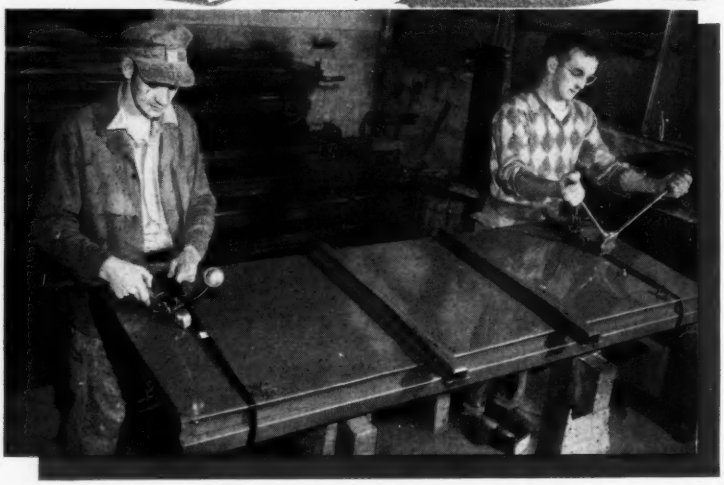
CLARK EQUIPMENT COMPANY

BATTLE CREEK 13, MICHIGAN

OTHER PLANTS: BUCHANAN, JACKSON, BERRIEN SPRINGS, MICHIGAN, U. S. A.

Another Leading Manufacturer *Uses* BRAINARD STRAPPING Exclusively





THE PERFECTION STEEL BODY CO., Galion, Ohio, manufactures many nationally known heavy steel, hard-to-package products. For example, steel truck bodies, platform stake bodies, Cobey Farm Wagons, Cobey Manure Spreaders and Perfection Burial Vaults. Last year, after extensive experimentation, Perfection decided to use the Brainard Strapping System exclusively. The reasons were numerous. The Brainard system is faster and easier to use. Brainard strapping is uniform — every coil of the same high quality steel — enabling Perfection to be sure their shipments will safely reach destinations all over the world.

SHARONSTEEL

Our engineers welcome the opportunity to study your shipping problems and recommend the most efficient method of strapping your shipments. No obligation. Write today.

Write today for our catalogue illustrating new economies in packaging.

BRAINARD STEEL COMPANY
WARREN, OHIO

ELWELL-PARKER PAPER LIFT TRUCK

ELWELL-PARKER FORK TRUCK

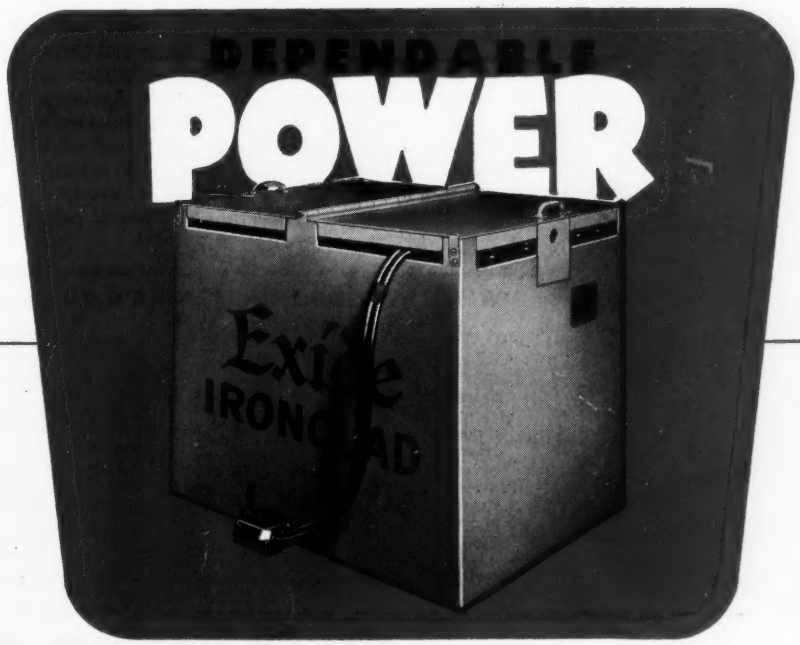
Battery Electric Trucks and EXIDE-IRONCLAD® BATTERIES

Help cut costs, save time, boost production

In plants where materials are handled the modern way . . . by battery electric trucks . . . every department benefits. Materials move more smoothly and in greater volume from processing, through warehousing to shipping. Savings up to 50% are not uncommon for they are made all along the line . . . savings in time, power, maintenance, operating costs. And when Exide-Ironclad Batteries supply the motive power, you can count on full shift availability, day after day, year after year.

Start battery electric trucks working and saving for you. Equip them with safe, dependable Exide-Ironclad Batteries. They have ALL FOUR of the vital characteristics of a storage battery—high power ability, high electrical efficiency, ruggedness, long life.

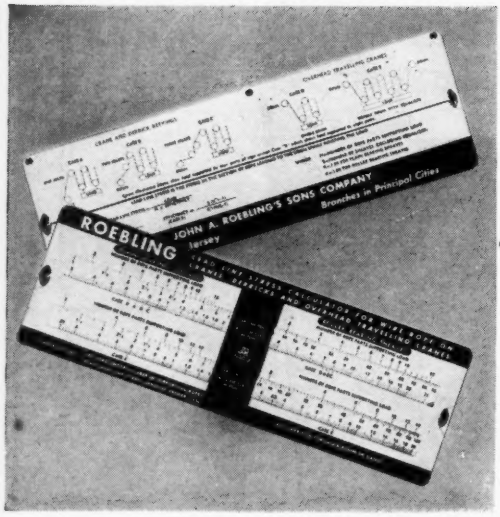
Write for further particulars and FREE copy of Exide-Ironclad Topics, which covers latest developments in materials handling and shows actual case histories.



1888...Dependable Batteries for 60 Years...1948

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

Confidence- WITH ITS SLEEVES ROLLED UP!



YEAR BY YEAR, planes grow bigger . . . faster and safer. Man has unbounded confidence in his ability to build better and better planes. Never satisfied, he experiments and tests tirelessly, and aviation progresses.

With similar vision and confidence, Roebling has been pacemaker in the development and manufacture of products essential to the transportation and other industries. The active, widespread confidence it has won among technical men and operators throughout industry is Roebling's proudest asset. Look to Roebling for continued leadership . . . continual improvement in its products and engineering . . . continual progress.

WHAT SIZE OF ROPE? HERE'S YOUR ANSWER—FREE

DATA used by Roebling engineers themselves are embodied in this unique "slide rule". It's the Roebling Lead Line Stress Calculator for wire rope . . . tells you in a moment the safe and economical size of rope for every load . . . gives the right answer for all types of crane, derrick, and overhead traveling crane installations.

Here's information you can accept and act upon with complete confidence . . . just as you can specify Roebling "Blue Center" Steel Wire Rope for unsurpassed toughness, dependable reserve strength and the reduction of costly replacement shut-downs. Roebling was America's first wire rope maker, and "Blue Center" Steel Wire Rope is the finest that Roebling knows how to make.

Write for a Roebling Lead Line Stress Calculator — it's free. And let your Roebling Field Man tell you about installation and maintenance practices that prolong wire rope life. Call him at your nearest Roebling branch office.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

A CENTURY OF CONFIDENCE **ROEBLING**

JR ROEBLING

★ WIRE ROPE AND STRAND ★ FITTINGS ★ SLINGS ★ SUSPENSION BRIDGES AND CABLES ★ AIRCORD, AIRCORD TERMINALS AND AIR CONTROLS ★ AERIAL WIRE ROPE SYSTEMS ★ ELECTRICAL WIRE AND CABLE ★ SKI LIFTS ★ HARD, ANNEALED OR TEMPERED HIGH AND LOW CARBON FINE AND SPECIALTY WIRE, FLAT WIRE, COLD ROLLED STRIP AND COLD ROLLED SPRING STEEL ★ SCREEN, HARDWARE AND INDUSTRIAL WIRE CLOTH ★ LAWN MOWERS

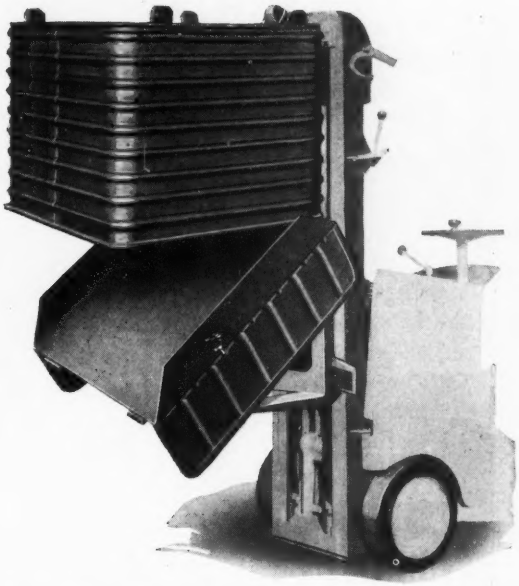
POWELL

BOTTOM DUMP ASSEMBLIES

STYLE NO. 310
BOTTOM DUMP BOX

Salvage and Disposal Problems are made easy

STYLE NO. 311—OPEN VIEW



Powell Gravity Bottom Dump Boxes are correctly engineered for safe transportation and discharge of load.

These boxes made in several types designed for your particular requirement.

DISCHARGING LOAD

STYLE NO. 312
ROLL-OVER FORK BOX

Representation in Principal Cities

THE POWELL PRESSED STEEL CO.—HUBBARD, OHIO

"ORIGINATORS of Cold Formed All Steel Handling Equipment"

Bassick Casters

THE COMPLETE LINE

From tea tables to ten-ton trucks — there are sizes and types of Bassick casters for anything you move.

casters illustrated are representative types

Bassick

MAKING MORE KINDS OF CASTERS . . . MAKING CASTERS DO MORE

Series "93"

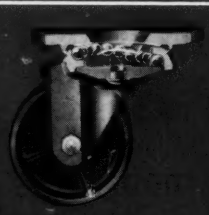
SUPER HEAVY DUTY

8" and 10" sizes will carry any load the floor will stand. Made with such precision they are really "machine tools of motion".

Series "61"

ECONOMICAL STEEL

Sizes from 2" to 6". Inexpensive, single ball race, rugged steel casters. Short heavy shingle gives extra strength and life.



Series "77"

MEDIUM DUTY

3"-4"-5"-6" and 8" sizes with the famous Bassick "Full-Floating" two-level ball race construction. BHT-80M material—80,000 lbs. tensile strength per sq. in. Rugged, easy swiveling, all-purpose casters.

Series "70"

LIGHT DUTY STEEL

1½"-2"-3"-4"-5" sizes. "Diamond-Arrow" light duty, two-level ball race casters for light equipment.

Series "99"

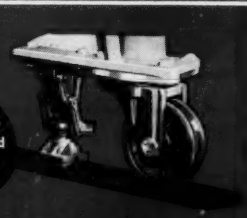
SILENT STEEL

3"-4"-5"-6" and 8" sizes with double ball race, projection welded casters. Fast, quiet, easy-swiveling, general-duty, top-quality casters.

Series "69"

FOR OFFICE CHAIRS

With 1½" and 2" wheels. "Diamond-Arrow"—the largest-selling quality office chair casters. For wood and metal chairs.



GROOVED WHEEL and POSITION LOCK

Grooved wheel casters on angle iron floor track make efficient assembly lines for economical production. Position lock holds equipment stationary at work locations . . . sets and releases at touch of toe.

"Floating -Hub"

LIGHT TO HEAVY LOADS

Carries liquids, fragile materials, delicate instruments, highly polished parts with maximum safety. Unique spring suspension absorbs jars and shocks, makes moving easier.

Bassick casters are sold by leading industrial distributors. For catalogs or help with special applications, write to the world's largest manufacturer of casters: THE BASSICK COMPANY, Bridgeport 2, Connecticut. Division of Stewart-Warner Corporation. *Canadian Division*: Stewart-Warner-Alemite Corporation, Ltd., Belleville, Ontario.

HOW MUCH DOES IT COST YOU— TO MOVE MATERIALS OVER 200 FEET?

Mercury "Tug" Electric Tractor Provides Fume-Free Motive Power For This Train of Mercury Type A-310 Trailers.

One Man Operating The Average "Trackless Train" Hauls The Equivalent of 8-10 Truck Loads.

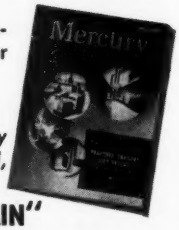
The Mercury "Trackless Train" delivers MORE tonnage in LESS time at LOWER Cost!

Experience has *proved* the greater efficiency of the "Trackless Train" in moving materials over *200 feet.*

Every ton hauled for *less,* because loads are kept on wheels . . . ready to move, no "dead" weight. Moves *more* tonnage by adding more trailers . . . no increase in power units.

Works as a versatile cost reduction team with your fork trucks—relieving them of LONG HAUL transporting—freeing them to handle and stack.

Investigate this low cost system today. For complete information, ask a Mercury Sales Engineer to call.



FREE: New Catalog No. 7-11

52 pages — illustrating and describing all Mercury equipment. Request your copy on Company letterhead, Today.

MERCURY FORK TRUCK - "TRACKLESS TRAIN"

Mercury Fork trucks "team up" with the "Trackless Train" to get the job done faster, easier and at lower cost. Fork trucks load trailers—tractor hauls trailers to destination—where fork trucks take over unloading and stacking.

Powerful, Compact Mercury, "Banty" Gas Tractor Hauls Train of Mercury Type A-310 Trailers.

THE MERCURY MANUFACTURING CO.

4154 S. Halsted St. Chicago 9, Ill.

MERCURY

TRACTORS • TRAILERS • LIFT TRUCKS

twelve tough trucks by

Each truck in this bunch of huskies is rugged. Each proves its ruggedness by results. Each is built by Fairbanks to do a specific type of heavy duty – and do it under haulings and maulings and poundings and punishment.

In the service for which it's recommended, a Fairbanks truck shows its extra sturdiness by keeping big loads rolling in a big way. From the dozen trucks illustrated, select the one best suited for your purpose; when you put it to work for you, you'll see that your choice pays off.

WAREHOUSE TRUCK

Fig. 9272—For handling boxes, cases and miscellaneous merchandise on the floor or shipping platform. Lengths 48" to 60"

BARREL TRUCK

Fig. 9301—For handling barrels, cases, bags, drums and rolls. Four sizes, 48" to 60" lengths.

FREIGHT AND CARGO TRUCK

Fig. 9169—Extra sturdy parts for railroad and steamship use. Lower crossbar forms wheelguard 60" handles.

FREIGHT TRUCK Western Pattern

Fig. 9203-S—Heavy construction for railroad, packing house use, etc Center straps welded to nose iron. Length 60"

BARREL TRUCK Western Pattern

Fig. 9207 – Wheels set between handles for use in narrow passages, curved crossbars. 48" to 54" lengths.

BARREL TRUCK

Fig. 9090—All steel, one-man truck with adjustable slide-lock, fits all barrels. Capacity 1000 lbs., Length 58"

CEMENT OR BAG TRUCK

Fig. 9217 – Heavy nose of ¼" steel plate provides strength for handling cement, fertilizer, etc., in paper or burlap bags. Length 52"

Commander STEEL-FRAME PLATFORM TRUCK

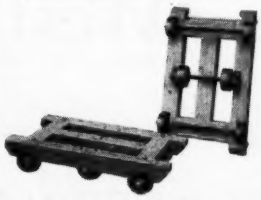
Fig. HQ2448—Steel bound hardwood platforms; sturdy construction, ball bearing wheels. Sizes from 24" x 48" to 36" x 72"

Commander STEEL-FRAME PLATFORM TRUCK

Fig. S2742-P – Tilting type, 8" diameter center wheels. Turns within own length. Sizes from 27" x 42" to 30" x 60"

PIANO OR MACHINERY TRUCK

Fig. Y1112 – Sturdy mortised construction with ½" tie rods at ends. Balances on two center wheels for easy handling of heavy equipment. Size 22" x 36"

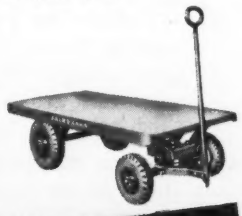


HEAVY DUTY WAGON TRUCK

Fig. 01459 – Four ton capacity. Solid iron cross sills support hardwood strips bolted with ⅝" tie rods. Large fifth wheel. Size 36" x 72"

ALL STEEL METAL TRUCK

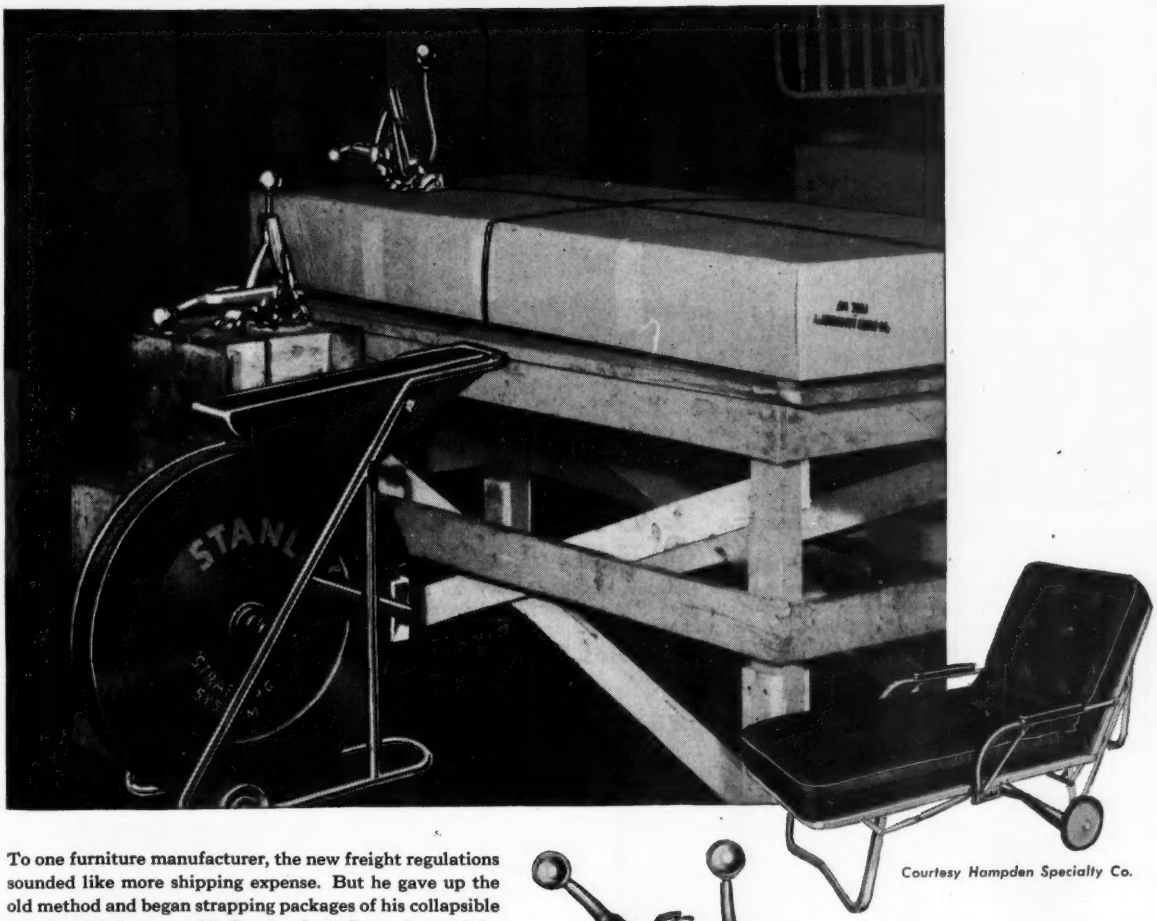
Fig. 01960-X – Continuous angle frame with round corners and solid steel plate platform. All welded construction. Sizes from 24" x 48" to 36" x 72"



Shown above are twelve headliners that rate top billing in the complete Fairbanks line of hand trucks and platform trucks for all kinds of duty, including the heaviest. There are many others also well worth knowing. Send for Catalog No. 50. The Fairbanks Company, 393 Lafayette St., New York 3, N. Y.; Boston, Pittsburgh, Houston.

American industry rolls on Fairbanks Trucks

Stanley Steel Strapping and the New Improved "ACE" Tool make new package FASTER! BETTER!

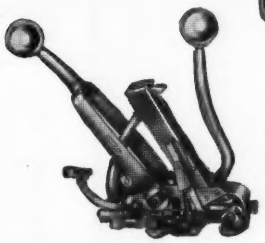


Courtesy Hampden Specialty Co.

To one furniture manufacturer, the new freight regulations sounded like more shipping expense. But he gave up the old method and began strapping packages of his collapsible metal chaise longues with Stanley Steel Strapping and the New Improved "ACE" Strapping Tool. Then he made the happy discovery . . . he was saving money.

The package made up faster, shipped better. Chaise longues arrived factory fresh . . . fewer complaints and adjustments, less lost motion.

The combination of Stanley Steel Strapping and the New Improved "ACE" speeds goods out of the shipping room, gets them there in better condition and saves man-hours, materials and shipping costs. The Stanley Steel Strapping System includes tools, reels and accessories for all applications. Write for folder. The Stanley Works, Steel Strapping Division, 203 Lake St., New Britain, Conn.



New Improved "ACE" Strapping Tool . . . four motions, five seconds from strap to seal. Positive spring feed seal magazine. The "ACE" comes in three sizes to fit all width strapping.

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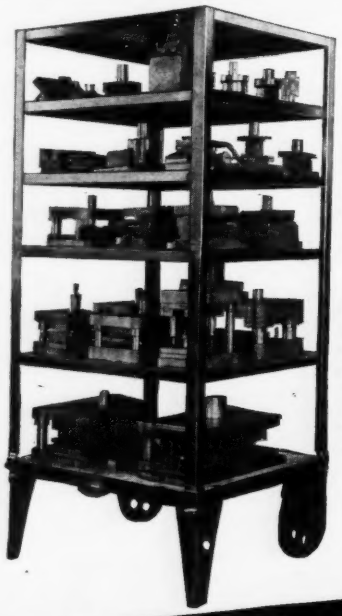

(Left) Turner Die Racks on Wheels. You move dies without waiting for lift trucks when you have Turner System Die Racks mounted on Transports.

(Right) These Shelf Racks fit on movable Transports and may be lined up side by side for vertical and horizontal expansion.

SAVE 50% FLOOR SPACE EQUIPMENT COST LABOR COST

with THE TURNER SYSTEM OF MATERIALS HANDLING

Modern lift trucks have revolutionized Materials Handling. They are doing a splendid job. But there are innumerable situations where their operation is unnecessary—and therefore a costly luxury. Use the Turner Transport and save time, labor and equipment costs.

The TURNER SYSTEM enables BIG SAVINGS in these ways:

1. Saves lift truck operation on short hauls.
2. Saves time waiting for lift trucks.
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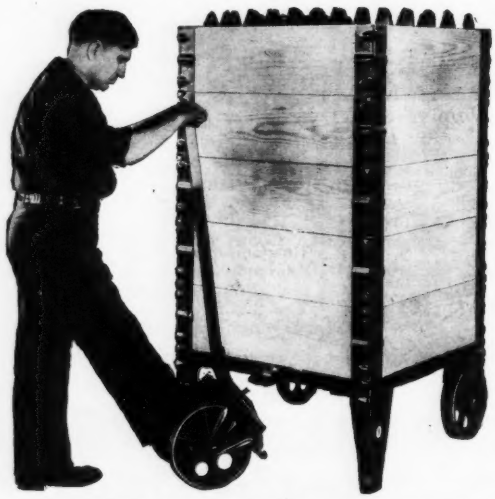
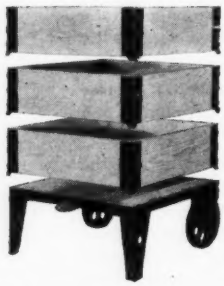
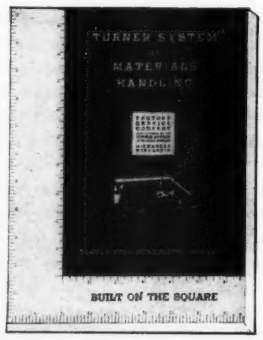
5. Saves labor with equipment designed for greatest efficiency.
6. Saves further expenditure because of rugged construction.



Supplements and works with modern Lift Trucks, Cranes and Tractors.



"DELIVER THE BIN AND SAVE THE HANDLING." Turner System Bins are all on movable Transports — always ready to go where you want them . . . as are all other Turner units. Bin Sections added or removed as required (right).



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COLD WAR, HOT WAR, OR NO WAR?

Irving B. Hexter

A FEW weeks ago I had the rare opportunity of spending almost a month with the Mediterranean Fleet as a guest of the Navy. You may imagine that it was a thrill and a most unusual experience.

Among many outstanding things evident on a trip of that kind, I think the most outstanding is the interdependence of Naval operations and American industry. Just because there is no active war being waged, just because factories are not bulging with war orders, it does not mean that the Navy does not need industry nor that industry does not need the Navy.

Because of generations of isolationist thinking, we Americans have a hard time getting used to the idea that our frontiers are in the Mediterranean, or in the Far East, or in South America. Global thinking does not come natural to us yet, but we are gradually getting accustomed to the idea.

Global frontiers mean global protective forces. Global protective forces—the Army, Navy and Air Force—require new concepts in supply techniques, in maintenance methods, in food preservation methods.

Because of political considerations no foreign country in this area may grant us bases for the repair, maintenance or supply of our ships. The best they can do is to let us use some of their harbors a few days at a time. This means, then, that when one of our supply ships starts to transfer supplies it must do it with absolute minimum of confusion and mistakes. Important supplies must be delivered to the right place at the right time, and inasmuch as the Force Fleet is not a static force, but rather, one which moves around from harbor to harbor, this is not always easy.

Inasmuch as our organization publishes magazines in a number of industries, my interest in the operation of the Sixth Task Fleet extended beyond supply and material handling problems, although those are probably the biggest.

The intricate job of supply must be done with the greatest possible dispatch. The job of supplying an entire fleet like the Sixth Task Force (as the Mediterranean Fleet is officially called) from supply ships is one which calls for the most advanced material handling methods. The thousand-and-one things required by

a fleet must be kept in ample supply at all times. These are matters that have engaged the attention of readers of one magazine FLOW.

As publishers of INDUSTRY and WELDING, I was much interested in the maintenance operations aboard every ship. Fleet operations, with all the practice exercises and regular sea duties, are wearing on every ship in the force. Without the liberal use of welding, it would be much more difficult, if not impossible, to keep combat vessels at sea for months at a time, unless there was a continuing repair program. And, of course, welding lends itself perfectly to those requirements because it is the perfect maintenance tool.

Because we publish THE REFRIGERATION INDUSTRY, my interest in food preservation was particularly active. The food aboard ship is excellent, qualitatively and quantitatively. Shore establishments cannot hope to supply the vast quantities of food required for a Fleet operation so, again, the supply ship does its stuff. But there is the additional problem of preservation. Again, without refrigeration the operation of the Sixth Task Fleet would be impossible.

The modern combat vessel is one of the most intricate pieces of machinery man has ever conceived. In it are used the latest developments in electronics, hydraulics and pneumatics, subject of our magazine APPLIED HYDRAULICS. It is a veritable nest of servomechanisms operating everything from the Number 1 gun turret in the forepart of the ship to the rudder mechanism in the stern. Much of our present day development in hydraulics has come from naval vessels and industry is indebted to the Navy for the experimental work which has been carried out in our Arsenal in this whole field.

Wherever there is a naval vessel there are hundreds of navy men living and working together in comparatively cramped quarters. Inasmuch as a naval vessel is in itself a small factory, the men are subject to all the accident and industrial health exposures of any worker in industry. Whether to protect the men from the excessive use of paint in confined quarters, or from using the lathe in the ship's machine shop, there must be the same industrial safety precautions taken that are found in the most modern plant. As publisher of OCCUPATIONAL HAZARDS, that interested me.

Thus, every industry must contribute to keep our ships at sea, our planes in the air, and our troops in foreign trouble-spots. There can be no letup now or in the foreseeable future because it does not look as though there will be any letup in the cold war. I do not believe there will be a hot war.

The greatest reason, in my view, for believing that there will be no war is the fact that we are better prepared for war than we have ever been before in peace time. This fact is the best insurance against war. Traditionally and historically, America will not seek war. If we are ready, no other nation will dare to provoke us.

Thus, industry, the secondary defense line of our armed forces, must play a signal and important part in keeping us out of war. Industry must so integrate itself into the needs of our highly technical defense arms that there will be no active war. Industry must help to wage this constant war of preparedness which may cost dollars but will not cost lives or bring the death of our cherished democratic institutions.

Irving B. Hexter

TIME STANDARDS . . . YARDSTICK for material handling

The Cadillac Motor Car Division tackled the difficult task of setting up certain material handling functions on a time standard basis. Included among the benefits are the following:

1. A reduction in handling time. 2. A definite measure of performance. 3. The most efficient and economical method for doing each job (through methods improvement). 4. A tool for accurate allocation of manpower. 5. A constant control that enables supervision to apply remedial measures when necessary. 6. A means of analyzing proposed revisions in order to predetermine if new expenditures will be justified on the basis of potential savings.

By C. D. DERNIER

Superintendent of Standards
Cadillac Motor Car Division,
General Motors Corp., Detroit

TIME standards have so far been applied primarily to productive operations; their application to non-productive operations has been avoided, by and large, because they are difficult to handle. Our attitude, however, has been that since any work takes time there is no reason why it cannot be timed. I want to emphasize also that the success in establishing and making the standards work is due in great measure to the cooperation of our operating organization.

The specific handling operations that were put on a time standard basis are in our receiving and assembly line feeding operations, and involve primarily tractor-train movements of palletized loads. (Such other indirect functions as maintenance and inspection, not concerned in this article, were also put on standards.)

Scope of Operation

Many obstacles had to be overcome since the project was put in operation about a year and a half ago. A brief description of the over-all operation will be useful as background.

Receivals were broken down by: (a) General Manufacturing Division and (b) Final Car Assembly Division. Both receive truck and freight car shipments.

Specific materials handled fall into three major groupings: 1. Purchased automobile parts (fabricated, semi-fabricated, and rough). 2. Raw materials for foundry and plating use. 3. Raw materials for expense fabricating, such as abrasives, paints and others which are not direct car parts.

The total tonnage amounts to about 200 truck loads and 15 freight car loads per day. This is exclusive of such bulk foundry raw materials as pig iron, coke, sand, limestone, etc.

Approaching the Problem

The first step was to make physical observations in order to determine the most economical method requiring the least amount of handling for all incoming materials. The first part of this program was to make a layout of the receiving room and to determine the distances the various types of materials had to be transported. (One move might take five minutes or 20 minutes.) Layouts were also made of the material placement at the various points of usage.

The second part of the program was to analyze each part as to how

it was received—whether loose, palletized or cartonized. With this information, unit trailer loads were established by considering size, weight and amount of trailer platform area required to transport a given part to its destination.

The third part of the program was to determine the methods to be used in (1) unloading receivals and (2) placement on inside stock handling equipment and (3) unloading from this equipment at the point of usage. Procedures were revised wherever this could be done to effect work simplification.

With the above methods established, we were then able to make time studies on each part necessary to establish basic standards on receiving and disbursing incoming material.

The standardization of handlings in the inter-plant tractor-train system was accomplished in a different manner. These had to be based on manhours required for a given trip; and a definite number of trips were required to be made per day in disbursing internally fabricated parts. However, by delegating a definite schedule, it was possible to determine the number of manhours per engine or per car as the case may be.

Time Standards in Operation

Thus the painstaking and exhaustive survey (the first step) was followed by methods improvement and preliminary standards. The latter were gradually adjusted to evolve final standards through subsequent refinements in procedures and methods.

The information gained was established on work routing sheets. This sheet includes standard time and the methods to be used for each material, also the destination as to department and bay in the factory. This form also shows the particular receiving room to which any incoming material is to be delivered.

The checker makes out the dispatch ticket in accordance with the information furnished on the production routing sheet, and thus the fork truck or tractor operator knows exactly where the loads are to be delivered. At destination, the material is picked up by the material handling line feeder, who places it either in the primary or secondary point of use.

"Primary" refers to portions of the stock areas or bays directly adjacent to the point of usage, while "secondary" indicates the nearby bay in which reserve stock placement is maintained. Our purpose is to keep all our material as nearly adjacent to the point of use as possible; and thus overflow material is likewise close at hand.

A word in elucidation of the material placement layouts mentioned in the first paragraph under the section heading "Approaching the Problem". A stock placement layout was made by factory bays, which established definite floats and assigned a specific location to each item. The floor space was laid out so that stock can be rotated on a first-in, first-out basis. Originally the line feeders referred to these layouts frequently, though this need became less as the men became familiar with the arrangement. This is another example of the carefully planned procedures that were used in establishing basic standards.

The labor for handling all parts is recapped into a total time for each automobile or engine, and a master routing sheet is then issued to all departments concerned, covering all phases of material handling, including:

1. Receiving and disbursing automobile parts. 2. Service car parts. 3. Maintenance materials. 4. Expense materials. 5. Foundry materials. 6. Tools and miscellaneous supplies. 7. Automobile bodies. 8. Reject materials. 9. Internally manufactured parts, which are moved from department to department.

Some Procedural Difficulties

There are some items that we can measure but which present difficulty in arriving at a unit standard time basis per car. Included in this category are such miscellaneous expense materials as tools and fixtures. It can't be said that we will receive 10 or 50 units per automobile assembled, and hence an exact ratio can't be established between tools received and cars produced. For this reason, this type of standard is arrived at through experience and agreement with supervisors.

A similar situation exists in shipping vendor reject material. It is practically impossible to determine the amount of this material shipped per car produced. As in any other plant, there is no repetition of this handling on a weekly or monthly basis. Hence, here too the standard time is arrived at on the basis of experience and agreement.

Another obstacle to the establish-

(Turn to page 54)

TYPICAL TRACTOR-TRAIN at Cadillac. Standard time hours measure its efficiency in delivering.

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Save Time *and* Effort *with* TOWMOTOR MH*

**MH is Mass Handling, the systematic movement of the most units, in the shortest time, at the lowest cost.*

If your handling operations call for fast, safe movement of heavy, bulky loads, let a Towmotor Model LT-90 Fork Lift Truck take over the hard work. Here's capacity to handle loads up to 15,000 pounds—and the power to lift, transport and stack those loads, easily and safely, in less time and with less effort than you ever believed possible.

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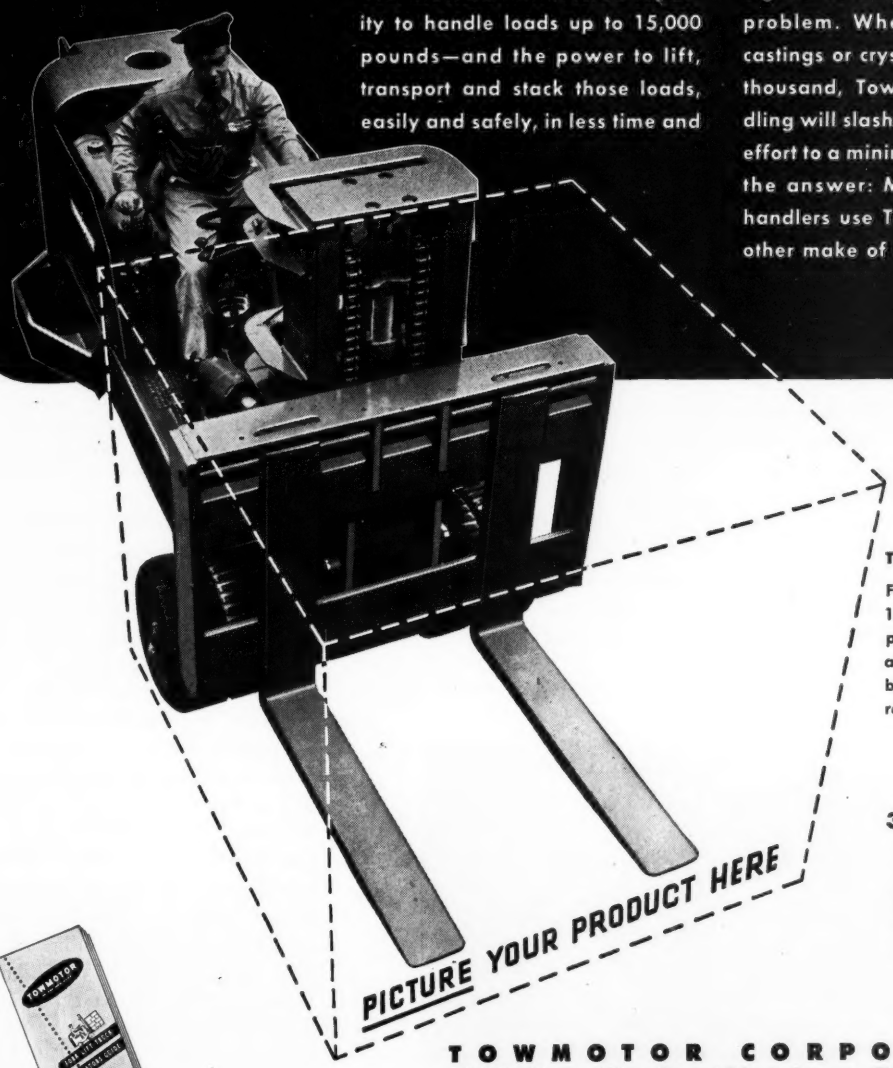

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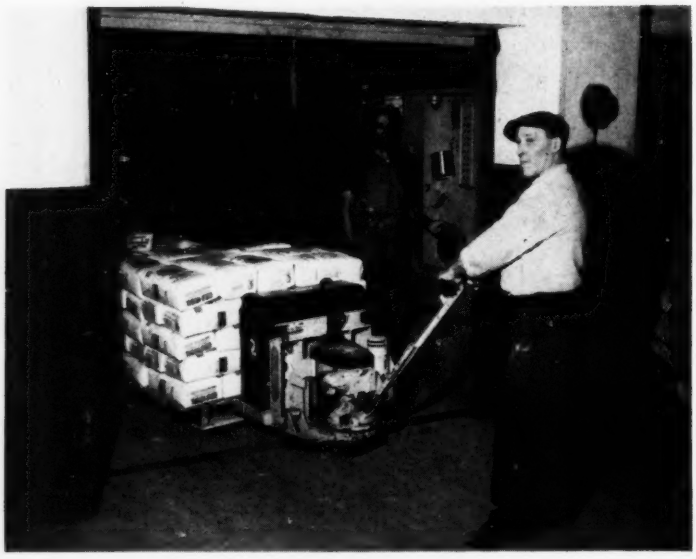
MODERNIZING a multi-story public merchandise warehouse

Conversion of a multi-story public merchandise warehouse from manual to mechanical handling has netted 250,000 cu. ft. of storage space that was previously unused.

By M. J. TANZER
Vice President and General Manager
Railway Warehouses, Inc.
Cleveland, Ohio

IT IS EASY to say that Railway Warehouses, Inc., by adopting mechanical methods gained the equivalent of 25,000 sq. ft. of additional storage space (250,000 cu. ft.) and at the same time cut the unit cost of handling by 35 per cent. Behind this achievement is a story of many problems that had to be solved. As FLOW articles have repeatedly pointed out in the past, the economies must be engineered. Every warehousing operation presents its own peculiar problems. These must be solved in relation to the structure, the floor load capacity, the layout of receiving-storage-shipping areas, the special nature of the business, and various material flow factors.



ELEVATOR TAKES load to its designated floor. Elevator capacity requires lighter truck.

MOTORIZED HAND PALLET TRUCKS, POWERED FOR TRAVEL AND STACKING

Problem Not One of Distance

Our company specializes in grocery items and household appliances. The compact 80′ x 200′ eight-story building (with basement) has approximately 145,000 sq. ft. available for storage. Six truck doors are located at the north end, with additional doors at the west end, and a six-car-capacity rail spur extends on the east of the building. Floor load limit is 300 pounds on the lower floor, and 250 pounds on the upper floors. Inbound traffic is about 70 percent by rail with the remaining 30 percent accounted for by highway truck activity, in and outbound. Two 5000 lb. capacity elevators are located in the center of the 200′ long building, a layout feature which holds the maximum move of floor traffic to 100 feet. Most hauls are considerably shorter.

From this general description of

OLD METHOD of storing barrels. Because of their weight they cannot be tiered manually.

NEW METHOD of barrel storing. With a high-lift truck and pallets, storage space doubles.

the multi-story plant, the layout and structural features stand out which determine the type of mechanical handling equipment we could use:

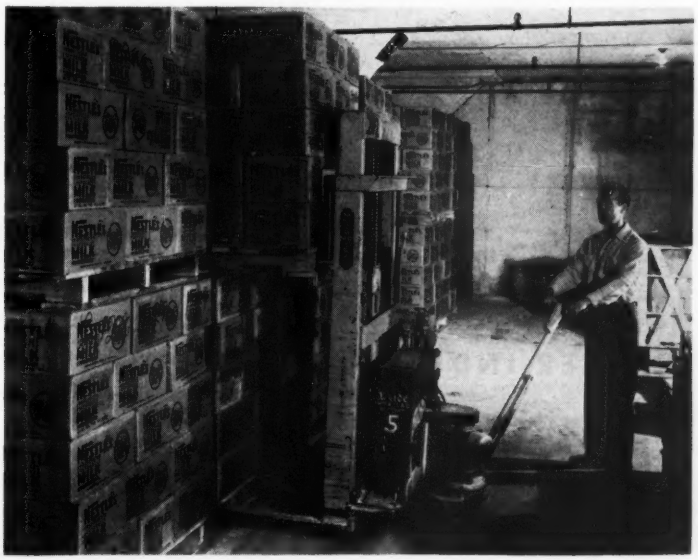
1. Compact layout with consequent short hauls. 2. Relatively low floor load capacity on the upper floors. 3. Elevators of 5000 lb. capacity. These factors precluded the use of heavy-duty riding type fork trucks which would have been required in a more extensive building. Our problem was not one of distance, but elevation. Consequently, powered hand pallet trucks were eminently suited to our operation. As the photos on these pages show, these trucks are of the low-lift and the high-lift or stacking type. The low-lift units of the fleet perform the transporting tasks, while the stacking type units tier and detier the pallet loads in the storage areas.

Conversion Introduced Gradually

The conversion to mechanical operations from manual handling, begun in March of this year, was introduced gradually. With the former manual operation, we were handicapped by the disadvantages commonly resulting from this method. Loss of pile height due to hand stacking meant loss of cubage; merchandise was improperly allocated in relation to turnover, resulting in excess elevator traffic; aisle layout and the presence of partitions interfered with the effective utilization of available square footage, and warehouse claims were also a problem. It is well known that internal damage results from excessive manual handling of individual cases.

When we introduced palletization, it would have been costly to rehandle the hand piled stacks in order to palletize all of them at once. To keep the conversion on an economical basis (with a minimum of non-productive labor) the hand piled stacks remained intact until they moved out in the normal course of turnover. All new incoming business was palletized and moved into the unoccupied areas, and in keeping with new floor plan design.

Orders for the units of our truck fleet and the pallets were likewise placed gradually. These purchases were synchronized with the step-by-step extension of mechanical handling on the various floors. A one-time purchase of all equipment would have meant keeping machinery idle as well as utilizing valuable storage areas for several carload lots of pallets which could not be put into service until months later. This would have consumed valu-



PALLETIZED CASES are easily stored. This system provides for faster inventory, shipping.

able storage space needed for merchandise.

As previously stated, the "walkie" type trucks are suited to the structural and layout features of the plant, and at the same time give us all the benefits of pallet handling. Several units of the fleet are permanently allocated to the receiving-shipping area. These trucks move merchandise from and to the vehicles, inbound or outbound. Since the low-lift type trucks weigh only 1050 pounds, they can be transported under load on the elevators when necessary, and because of the extremely short turning radius of these units, we were able to keep aisle widths to a maximum of 7½ feet, which is a substantial gain in square footage available for storage purposes. As the merchandise stacks decrease in the standard 20′ x 20′ carlot bays along the walls, the remaining goods are moved into the 20′ x 12′ bays for smaller lots provided in the center of the building. With the pallet fork truck method, these transfer operations are performed in a minimum of time and effort. The operators move and stack 2000 pound to 4000 pound loads simply by manipulating the push-buttons built into the handles of the equipment.

Planning and Implementation Take Time

The importance of adequately engineered methods cannot be overemphasized if maximum efficiency and maximum economies are to be obtained from the new method. A comprehensive study preceded the choice of a pallet size. We adopted the 40″ x 48″ as standard. This double-face, non-reversible pallet we found to be most adaptable to general merchandise items packed in cartons, cases, barrels and drums. This size also offers maximum flexibility for loading in box cars, refrigerator cars and highway trucks. In a standard freight car, two of these pallets can be placed the long way across the floor (with an empty pallet standing on edge for dunnage between the two

loads). In a reefer car, one pallet spotted the long way and another the narrow way fill up the width of the space, while in a highway vehicle two loads can be placed side by side the narrow way (if required by the width of the truck bed). In short, the load carrying surface of the various carriers can be utilized with this pallet size to best advantage.

No one should expect a conversion program of any scope to be accomplished in a few months. We are still in a transition period since last spring, and in the meantime further refinements and improvements are being studied and developed wherever feasible. An example is a program now being established with large food store chains and wholesalers to accept palletized shipments of general merchandise. Under this program the exchange of pallets between warehouse and customers becomes a bookkeeping transaction. Outbound pallets are charged to the customer, who receives a credit when he returns the empties. An understanding is being worked out on the cost per pallet in case of loss or breakage in a customer's plant.

Such an arrangement, when completed, will have far-reaching effects in regard to the over-all efficiency of the mechanical handling program. Pallet handling of outbound merchandise will eliminate three rehandlings of individual cases, as follows: 1—on the truck at the warehouse; 2—off the vehicle at the customer's plant; 3—repiling in the customer's warehouse. In many instances, a fourth handling will be saved where the customer is in a position to ship palletized loads from his own warehouse.

Important Improvements

Other advantages: Vehicle waiting time will be eliminated; likewise congestion at the loading platform. With 50 cases of many types of commodities piled on one pallet, it will be possible to load a vehicle with hundreds of cases in a matter of minutes. The efficiency of out-

bound checking will be greatly increased. With 50 cases to the pallet load, for example, the checker will know at a glance that four pallet loads make up the 200 cases which a truck came to get. With manual handling of individual cases, much valuable time is often wasted in making sure if a man has just brought out or loaded 18 or 23 cases, to choose a typical example at random.

Operating advantages of mechanical handling seem to multiply when every phase of the project is thoroughly developed. It is well known that the pallet method facilitates the taking of inventory. With a standard number of units of each item stacked per pallet, the inventory operation can be performed in hours (a job which usually takes days). Palletizing also tends to reduce pilferage. The top cases of a stack are too high to be reached without special effort, and such effort, when it is made, is frequently all it takes to attract attention. And it is not feasible to remove a case which supports weight within the stack. All these items, in turn, have a bearing on faster and more accurate bookkeeping.

Thorough Study for Maximum Benefits

Detailed attention to every phase of the program results in lowest unit handling cost. Conversely, a part of the benefits of a mechanical handling program can be nullified when certain details (of control or physical handling) are ignored or overlooked. Our record system, for example, has been streamlined and simplified in keeping with the present faster operation. The scope of this article permits a mention of only the main features:

1. Automatic register machine which prepares delivery ticket, bill of lading, posting copy and accounting copy in one operation. 2. Perpetual inventory synchronized with inventory card on stock pile. 3. Dual manifest forms used, one for the office and the other for the Operating Department. This en-

ables the office to prepare all clerical detail while physical operation is taking place. Compared with the old method, physical operation would be completed first, then documents deposited in office for clerical details. Under the streamlined method, office detail is frequently completed long before physical operation takes place, resulting in better service. 4. Multiple switch-box on order taking desk permits order taker to answer several incoming calls at one time. Immediate attention to telephone orders is the result.

Another innovation is the clocking of all orders. As an order comes in from a customer, it is stamped to show the time of arrival, and again stamped when the order is completed and loaded. 1. The elapsed time indicated keeps at the superintendent's finger tips vital data on the efficiency of the operation. 2. A record of the time element gives the warehouse personnel the facts when complaints come in about delays. 3. Since a record is thus available of daily gang production in tons, clocking also contributes to simplified cost accounting.

Another part of simplified paper work procedures is the perpetual inventory system which we have adopted. Individual cards, inserted in metal frames, are maintained at each stockpile. The frames preserve the records and prevent their loss. A glance at the card shows instantly the amount on hand, and can thus be referred to for checking or verification purposes.

Controls and Refinements

Control over personnel is sometimes difficult in a multi-story building. We have assigned each checker the responsibility of operating two floors. Each man is held accountable by the superintendent for good housekeeping, orderly stacking, production per manhour, errors, fire prevention, and pilferage. The usual procedure for a checker is to fill orders from all parts of a building, which is frequently a time-wasting job in ex-

tensive plants. Since our checkers are confined to two floors only, each one become intimately familiar with the stock in his area. No time is lost with searching during order selection operations, and the possibility of errors is greatly reduced.

An important factor in developing streamlined material flow was to allocate stocks in relation to their rate of turnover. Thus fast-moving merchandise was concentrated on the three lower floors. This method avoided excessive elevator traffic, and made better elevator service available to the upper floors. Another result was a marked reduction of congestion in floor-to-floor traffic.

To further expedite between-floor material flow, we are planning some changes in plant layout. Power or gravity conveyor lines will be installed, unless our plans are changed, from the second floor to the first floor (the latter serving for distribution purposes and service functions exclusively). This conveyor line will be used for routing less-than-pallet lots from the stockpiles to the outbound carriers. For moving full pallet loads from the upper to the lower level, a monorail carrier will be installed on the second floor. According to present plans, this equipment would transfer the loads through a hatch cut in the floor of the second story. The monorail track would extend over an aisle on both sides of which fast-moving merchandise is stored. A high stacking truck will be assigned to set the necessary pallet loads out in the aisle for transfer to the lower floor.

Communications Contribute to Success

Instant communications are essential to an efficient operation where men and merchandise are constantly moving on several floor levels and where scores of outbound vehicles must receive the correct merchandise in minimum time. (You will recall that the orders are clocked.) We use two communication systems. One is a loud speaker system between executives and key

(Turn to page 56)

INSTITUTE AND ASSOCIATION ACTIVITIES

SAMUEL W. GIBB was the speaker at the September meeting of the Indiana Chapter, Material Handling Institute, at the Severin Hotel, Indianapolis. The topic of his talk was The Future of Material Handling. The members participated in a general discussion of material handling problems in various industries, the method of instituting a material handling program, and the way surveys might be taken of plant operations and material flow. Chapter officers are: E. W. Mikels, Diamond Chain Co., president; Wendell Phillips, Eli Lilly Co., first vice president; Clare Falkner, Material Handling Equipment Co., second vice president; Robert L. Anderson, Stewart-Warner Corp., secretary-treasurer.

APPROXIMATELY 200 people were present at the September meeting of the Midwest Material Handling Society, Chicago. The address was given by Harry E. Stocker, president of H. E. Stocker Assoc., Inc., whose topic was Material Handling Principles and Applications. Irving B. Hexter, publisher of FLOW Magazine, gave a brief talk. Listed among the speakers at future chapter meetings are Norman Cahners, Modern Material Handling; Dr. R. W. Stone, University of Chicago; Ezra Clark, business counselor; C. F. Kells, Managing Director, Electric Industrial Truck Association; and Mathew W. Potts, Distribution Age.

THE Northeastern Ohio Chapter (Cleveland) elected the following officers for the coming year at its September meeting. President, George A. McManus, Thompson Products Co.; vice president, Roy N. Stevenson, Lamson & Sessions Co.; secretary, Dwight Filkins, The Wallace Co.; corresponding secretary, Harry Morrison, Morrison Co.; and treasurer, Frank C. Wier, Timken Roller Bearing Co. Plans for the coming year were considered and a proposal was approved to include plant visits in the program. Chapter meetings are scheduled for the third Thursday in each month.

THE following men have been elected as officers of the Detroit Chapter: President, C. F. Parkinson, Soss Mfg. Co.; vice president, N. M. Quint, N. M. Quint Co.; secretary, R. N. Burgess, General Electric Co; and treasurer, Eugene J. Salay, Ford Motor Co. The chapter will meet six times a year, January, March, May, July, September and November, with the annual meeting of the chapter in May.

THE newly organized Atlanta Chapter has elected these men to head the group: Chairman, R. A. Honiker, Fulton Bag & Cotton Mills; vice chairman, C. R. Blair, Ford Motor Co.; and secretary-treasurer, R. C. Dodson, Noland Co., Inc.

THE Material Handling Society of Philadelphia held its first fall meeting recently at the Poor Richard Club. A talk was given by J. Kreuzberg of Sears, Roebuck and Co., Philadelphia, pertaining to material handling in the company's new Philadelphia warehouse. A film showing the before and after results was presented. The Society's meetings are scheduled for the third Friday of the month.

Here are the judges...

...for the Second FLOW Material Handling Cost Analysis Contest

J. R. Kilander

B. H. Sibley

R. D. Fell

● THIS YEAR AGAIN, three outstanding men specializing in material handling and industrial cost accounting have been selected to judge the entries in the 1948 Contest. They are:

J. R. Kilander, General Electric Co., Schenectady.
Brace H. Sibley, Champion Spark Plug Co., Toledo.
Richard D. Fell, National Screw and Manufacturing Co., Cleveland.

J. R. Kilander is now completing his twentieth year with the General Electric Co. He spent more than ten years of this time in the Factory Engineering Division, where he was active in development and design work. At the present time Mr. Kilander is associated with the Apparatus Department, Manufacturing, and has for several years devoted most of his time to the varied material handling operations found in large organizations.

B. H. Sibley is Factory Manager of the Champion Spark Plug Co. His responsibility is company-wide and extends beyond the parent factory in Toledo. Mr. Sibley is also in charge of the Windsor (Canada) plant and the Feltham (England) plant. He has been responsible for many improvements in handling methods in these plants, and has been active in organizing the Toledo Chapter of the Material Handling Society. Prior to his present position as manager he was in charge of engineering for Champion. He is a member of the Society of Automotive Engineers and is now serving as a member of the SAE Production Activity and Meetings Committee.

R. D. Fell is a nationally known specialist in industrial cost accounting, and his work at National Screw and Manufacturing has kept him for a number of years in close touch with costing material handling operations. He has been active for more than 10 years in analyzing and determining production costs. His position is that of Manager of Cost Accounting at National Screw and Manufacturing Co.

Winners will be notified by wire as soon as the final ratings have been completed. Papers must be mailed by midnight, November 15, 1948, to qualify for the $1500 prize awards.

Men In The News

THE PESCO PRODUCTS Division of the Borg-Warner Corp. has opened a new district sales office in Chicago. It will be directed by J. D. Campbell, assisted by C. B. Maple, Jr.

OTTO G. SCHWENK has been appointed vice president in charge of production of The Yale & Towne Mfg. Co., according to an announcement by Calvert Carey, president. Before joining Yale & Towne, Schwenk was serving as assistant to the president of The Weatherhead Co.

A NEW branch office in Boston has been opened by the Durant Mfg. Co. It will be under the management of James K. McGinley. The office will serve Maine and New Hampshire, in addition to the Boston area.

A C. MONTEITH, engineering executive of the Westinghouse Electric Corp., has been elected vice president in charge of engineering and research, Gwilym A. Price, Westinghouse president, announced. He succeeds Marvin W. Smith who was elected as executive vice president of Baldwin Locomotive Works.

FRANK G. HOUGH, president and founder of The Frank G. Hough Co., announced the appointment of G. A. Gilbertson as vice president. Gilbertson recently resigned as sales manager of the Industrial Power Division of The International Harvester Co.

EDW. G. MURPHY who has been Maine representative for Thomas Truck and Caster Co., Keokuk, Ia., has been appointed eastern field sales manager according to a recent announcement. The creation of an eastern field office located in Buffalo is the second step in an extensive expansion program planned by the company.

WILLIAM W. ST. CYR has been appointed sales representative in the states of Louisiana and Mississippi, according to George R. Brockway, sales manager of The Rapids-Standard Co., Inc., material handling equipment manufacturers of Grand Rapids, Mich.

When you maintain adequate costs records . . .

IT'S EASY TO PROVE YOUR SAVINGS

Winner of the fourth prize of $100 in the 1947 FLOW Cost Analysis Contest. NOTE: November 15, 1948, is the deadline of the current contest. To qualify for one of the cash awards totaling $1,500, all papers must be mailed by midnight of that date. Send us your completed paper as soon as possible. This will help speed the grading work. The judges will be announced in the December issue of FLOW.

By AUSTIN M. ELLIOT

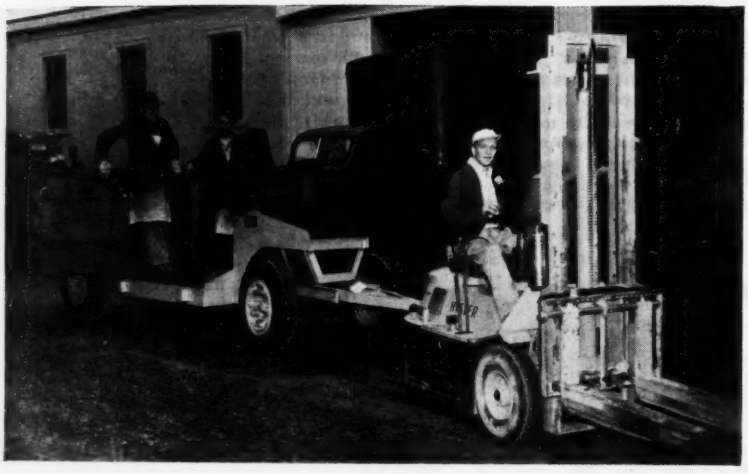
Industrial Engineer, Lapp Insulator Co., Inc., LeRoy, New York

A WELL-ORGANIZED cost accounting department and an alert plant methods section are standard tools of long usage. The possibility that modern and very successful plants are total strangers to these two may seem inconceivable to many, but such situations do exist. This is mentioned because the outcome of this article brings to light some amazing revelations, like discovering that the beautiful girl you married is also a darn good cook.

A Bulk Material Handling Problem

In the manufacture of porcelain, the chief ingredients, flint, felspar, ball clay, etc., present a real problem in bulk material handling. To take advantage of gravity discharge within the plant and to avoid the occupancy of too much square footage of floor space, each component

FORK TRUCK hauls trailer when not working with scoop. View at right shows the scoop attached.



material in our plant is stored in a 20-foot diameter by 40-foot high concrete silo. Fed by a bucket elevator charged from a boot below ground level at rail-side, this installation complies with sound material handling practice.

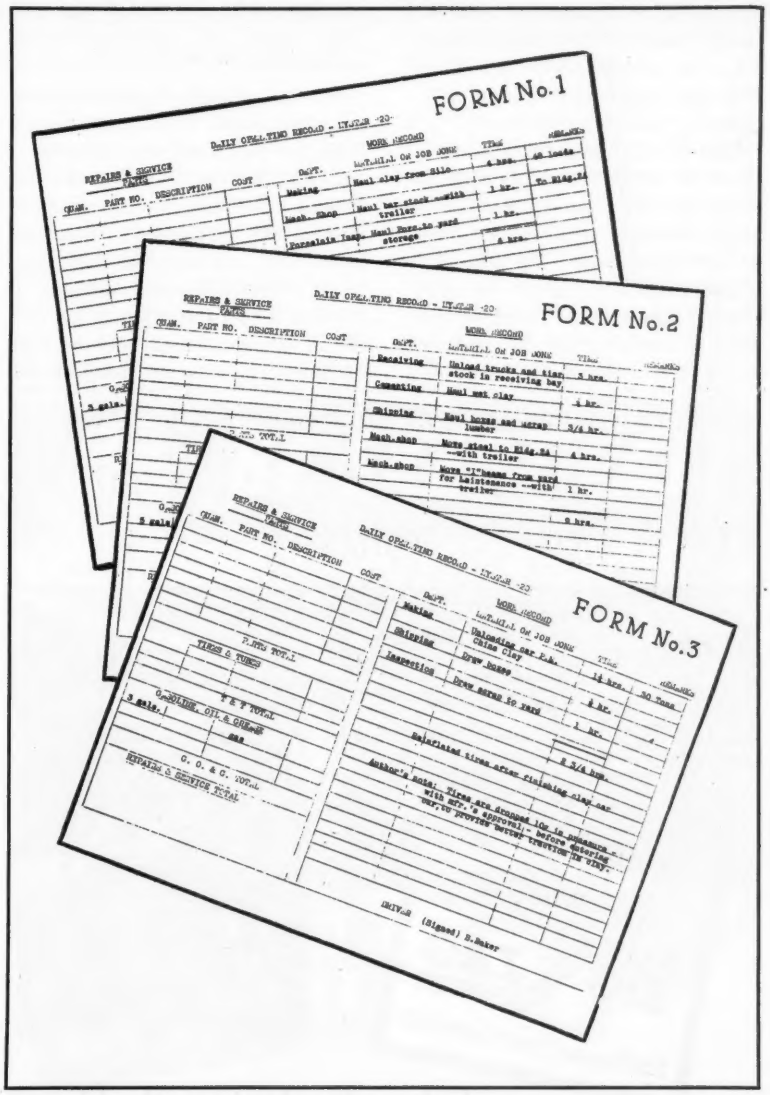
It is in the initial movement from railroad car to bucket elevator boot that we come to the topic of discussion. Requirements of manufacture and strict laboratory control are reasons for delivery in sealed box cars. From opening of the doors to final sweep-out of the cars —which are classified "clean lading" and used by the factory shipping department for outgoing finished product—took from one to 2½ days, from five to eight men, or an average of 58 man hours a car. Taking an average rate of $.925 an hour for the men involved, this worked out to a labor charge of $53.65 or $1.53 a ton for an average 35-ton car. This was under the old method.

The above figures were gleaned from standard labor sheets listing the men's daily activities and car bills of lading.

In this instance, as in others where comparative figures are not compiled, there was nothing to indicate that the hours or cost per ton was unduly excessive. But such a fact is glaringly revealed when adequate cost records are the standard practice. However, the spectacle of four or five men armed with shovels and one or two wheelbarrows in the narrow dusty confines of a 40-foot box car of clay should be enough to provoke some investigation. To those who may feel that such conditions could not exist in their factory, it should be remarked that such a condition prevailed inconspicuously for nearly 20 years in a by no means unprogressive plant.

Something Was Overlooked

Under the general accounting system which prevailed at the time (detailed cost system was used only for direct labor), good comprehensive figures of time, rates, tonnages, class of material, car numbers, etc., were readily obtainable.



DRIVER-MAINTAINED RECORDS. Itemized operations merit scrutiny. See author's note, Form Three.

Adequate cost control would have told of this constantly, but all too frequently such reports are devoted solely to direct costs. It is no secret that members of works management, also many belonging to the accounting branch, are totally at a loss when it comes to either the setting up of proper costs or making correct deductive summations from records that do exist.

In this particular instance, where increased production made for more cars to unload, costs were rising. This situation is familiar to those in the engineering and management groups.

Cognisance of handling and costing practices, considered as a team, can be relied on to provide a solution. For example, one piece of equipment that was viewed in operation during our search for an answer performed marvellously, but initial cost was extremely high. Though this was not a primary consideration, the unit was purely single purpose. Since in our case only 18 cars a month are unloaded, with an operating expectancy of from 1½ to two hours per car, an investment of about $3000.00 for 36 hours a month service seemed uneconomical. In other words, one piece of

equipment that might be ideal for one job may not be suitable for another in a comparable operation. The type and length of service determines the selection.

Therefore, thought was given to a unit for which other uses could be found in "off" hours, though this might result in some service sacrifice or compromise. It is well to consider this latter point when purchasing any type of material handling equipment for intermittent use. Such a machine was found and adopted.

"That May Do for Now, But. . . ."

It was a standard gasoline powered pneumatic tired one-ton fork truck on which may be mounted a scoop of 1/3 cu. yd. struck load capacity. The time of unloading fell rapidly car by car to around two hours and two men, or four man hours at $1.04, amounting to $4.16 labor or $.12 a ton for a 35 ton car. It is a saving so overwhelming that further addition of indirect costs for gasoline, depreciation, etc., represent more detail than seems warranted. *(Cost analysis papers should include all pertinent cost factors. Contest entries are not judged on the basis of the amount of the saving effected, but on the completeness and accuracy with which the savings are substantiated. See the first prize winning paper in the issue for March, 1948, page 22.—Ed.)* Suffice it to say that previously where a 360-ton month had cost $545.30, depending on clay conditions, it now and for a period of half a year has run in the neighborhood of $43.20 a month. Improvements mentioned further along shade this sufficiently to cover contingencies such as major engine overhaul, which is necessitated by extreme dust conditions.

Amazing though these figures seem, there is on the board a new scheme, pending only some allied plant modifications, which will slash this figure by more than half. But first achievement must not be followed with a satisfied "now—that's done" but rather with a restless "well, that may do for now—but. . ."

While the aforementioned solution represents a substantial saving and points a real case for good material handling practice, such applications usually offer additional monetary savings through the constant search for ways and means of modifying and adapting, increasing serviceability, and thus efficiency.

The Important Details

Addition of scarifier teeth to the scoop, made of 10 mower guards purchased from a local agricultural implement dealer, increased the amount of "bite" an average of 75 pounds. Recent modifications of the engine cooling system reduced blow-off time after dusty operations, and should present real savings on the next engine overhaul. Change of dumping controls from right to left, within the orbit of motion of the operator's free hand, made for an average of 25 minutes over-all saving on a 50-ton car.

Work is being carried on with two major tire companies in an ef-

fort to develop an anti-skid tread for use in wet clay and with sufficient abrasion resistant stock to withstand scuffing experienced in loading sagger scrap (an unglazed friable fired body similar in texture to broken brick or sewer tile). It is hoped that this development will further lower costs by increasing efficiency and reducing tire replacements.

In this connection, I want to say that the material handling man should get an extra star in his crown for persisting despite the apathetic way in which some manufacturers treat improvement requests, only to leap in with both feet and sometimes a brief acknowledgment once the changes prove out.

Figures Don't Lie

It is interesting, after a year of service, to look over the driver-maintained records of this vehicle. Representative sheets, included here, couple the data with some additional facts.

Form One shows an item "Haul clay from Silo—four hours, 48 loads." This was formerly done by two men. Each one shovelled, then each wheeled alternately a 250-pound buggy. A 48-load job took them eight hours, or 16 man hours, which at $.91 an hour amounted to a labor charge of $14.56. Adaptation in this case required only the welding of a brace across the legs of the buggy to allow purchase of the forks of the new unit. One man loaded and two buggies were in constant operation—the hauling back and forth being accomplished by the equipment in exactly four hours, or one-half the time, for a total direct cost of $8.16 plus two gals. of gas for a round trip distance of 1468 feet.

Other jobs are also worthy of mention. Several are outside on rough terrain, hitherto inaccessible to other handling equipment because of small hard rubber tires and lack of chassis clearance.

The design and purchase of a specially built trailer added dollars of value and virtually immeasurable usefulness to this prime mover. As shown in a photograph, an old pickling tank is loaded and on its way. Structural steel, bar stock, pipe, barrels and a host of miscellaneous materials can be transported practically anywhere in and around the plant. The unit easily passes down the aisles and through fire-doors—barriers to the smallest pickup truck, which in most cases could not handle the tonnage anyway.

The unit singly, or coupled to the trailer, may be sent to any one of several branch warehouses about town, acting as its own loader for palletized loads, even supplying winch power to skid on or off the trailer any bulky loads.

Savings such as these give considerable spice to the job of the material handling engineer. They are apparent to him because he is directly involved. But when they become a matter of record under an adequate cost control system, then they tell a story which everyone can see, understand and believe. No one can minimize accurately compiled performance figures.

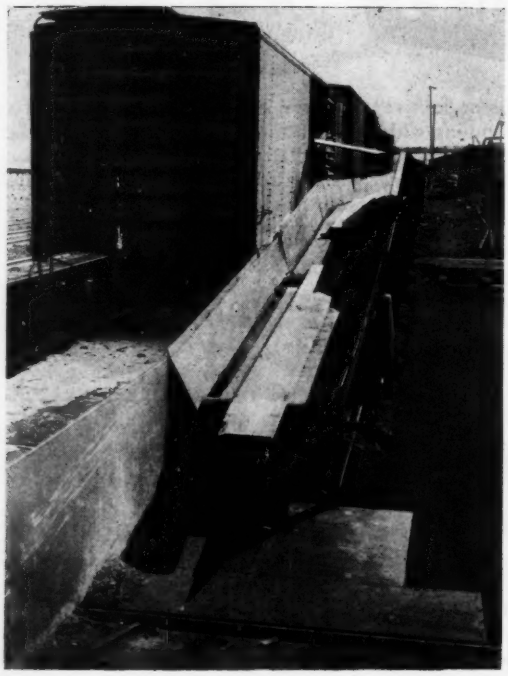
In this lumber yard, mechanization brought . . .

20% MORE PRODUCTION 35% LOWER COST

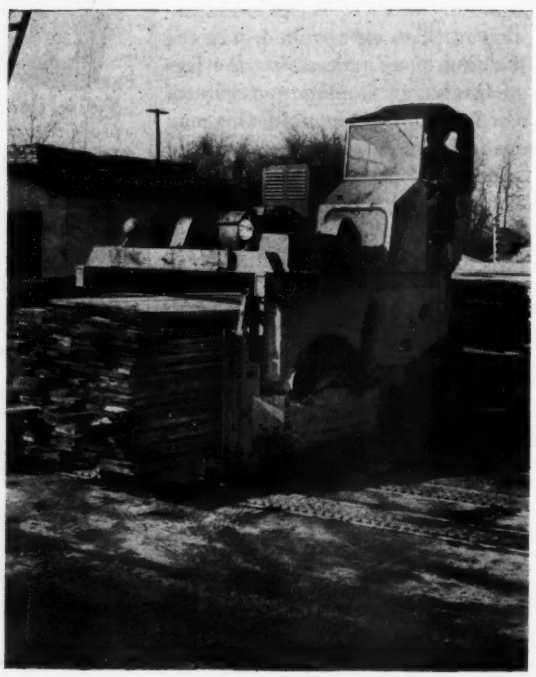
STRADDLE TRUCKS, CONVEYORS, TRACTOR HYDRAULIC LIFT, CAR PULLER

IN THE lumber industry, certain operations lend themselves more readily to mechanized handling than do others. Some of the difficult problems in this respect are encountered in the processing of rough lumber. The steps involved are car unloading, grading, sorting, sticking and kiln car loading. All of these are known to entail considerable manual effort and time. Nickey Brothers, Inc., Memphis, Tenn., developed methods which slashed handling cost to one-third of the former, and at the same time the plant productivity has been appreciably increased. This was the result of a careful analysis and subsequent mechanization of a number of the old methods mentioned. The present description of the company's operations indicates the industrial engineering involved in the conversion to modern operations.

Belt conveyor for car unloading. Note one of the sorting conveyor chains in foreground.

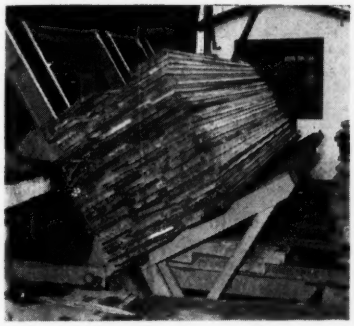


Straddle trucks accumulate and transfer loads to sticking operation. Note floor chains.



Fast Unloading Operation

The company manufactures hardwood flooring and dimensional lumber. An average of 100,000 board feet of rough lumber is received in box cars daily. The material ranges in length from four to 18 feet, in width from two to 24 inches, and in thickness from one to two inches. As each boxcar contains approximately 16,000 board feet, six to seven carloads must be unloaded daily. This used to be a time-consuming job.

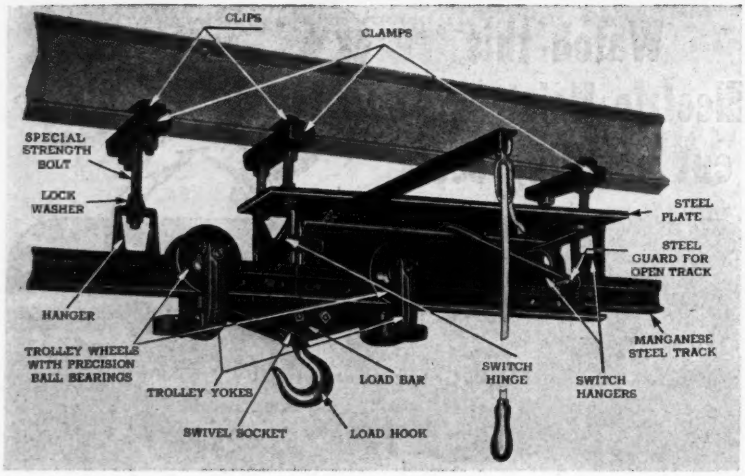


Hydraulic unit removing load from bolsters and positioning for unloading onto kiln car.

Here is how this operation was modernized. A high-speed 24-inch-wide belt conveyor was installed parallel to the railroad siding and immediately adjacent to the sides of the cars. This belt runs in a steel trough, as shown, and has a low side next to the car and a high one on the far side. Two men, stationed inside the car, unload by merely sliding the lengths of lumber into the trough. The high outer side acts as a deflector, and hence the more time-consuming careful placing of each board is no longer necessary. Through this technique, a 16,000-board-foot carload is unloaded easily within three hours by two men, which is approximately 1/8 of the time required previously.

Although four cars can be spotted next to the 200-foot long conveyor, only two are unloaded at the same time. The belt runs at the relatively high speed of 400 feet per minute with a "hurry-up" section at the end traveling at about 800 ft. per minute. This speed is neces-

(Turn to page 82)



TYPICAL EQUIPMENT comprising a monorail system. Four-wheel trolley approaches a two-way switch. Track and switch are suspended from a building beam by a series of threaded rods.

A monorail material handling i allation i various types of carriers, which ar escribed article which is scheduled for nex month. T voted primarily to the trackage, sw es, trolle

There is practically no major ty of indust rail, either as the plant's main sy m or as conjunction with other equipment. hus mon to all types of operations—receiv , proces storing and shipping.

MONORAIL . . . *overhead t*

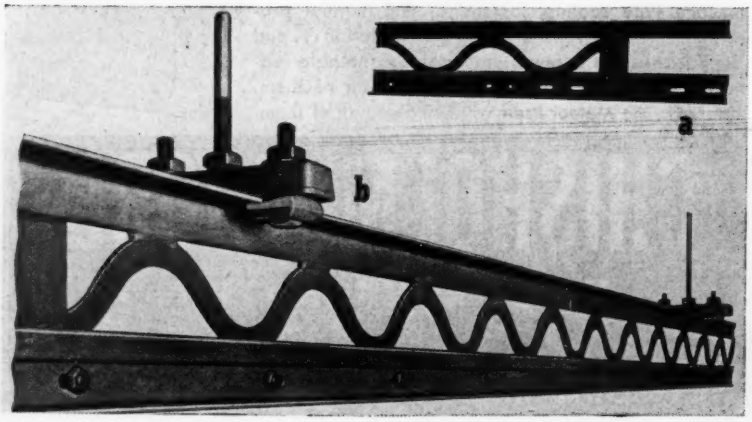
PART I

Track Selection

NORMALLY, the selection of the track to be used depends on: 1. Size of unit loads and number of loaded trolleys which may be adjacent to one another on any part of the system. 2. Whether or not motor propelled carriers will operate on the system. 3. Distance between available supporting points, or desired distance between supports from added superstructure. Light loads may require heavy track where spans are great, or lighter track may suffice for heavy loads where frequent spacing of supports is economical. For duty cycle, if frequency of traffic is high, for example in certain automatic dispatch systems, wear becomes a factor, and it may be more economical to use heavier equipment than the weight of loads would normally require. Depending on the specific operation, consideration must be given for the inclusion of appropriate lifts, switches, turntables, scales, etc.

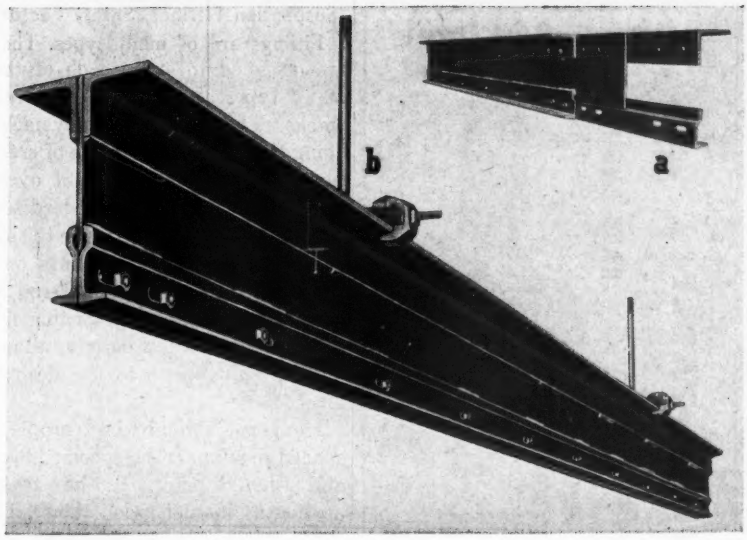
Monorail tracks are usually sections of "T" or "I" shape, rolled from high carbon manganese steel. According to Monorail Standards, released by the Monorail Manufacturers Association, the flange of the track on which the trolley or carrier wheels roll should be formed of steel not less than .40 carbon and .35 manganese and of uniform hardness. Rails are usually available in girder and truss types.

The rails may have flat running treads on the inner faces of the lower flange. Built-up girders, often used for long spans between sup-



TRUSS RAIL, one type of track. (B) Rail is gripped with hanger which is connected to ceiling beam with threaded rod. (A) Overlapping splice of top chord and bottom track section develops continuous beam strength.

ing installation is an overhead roadbed for ch are described in detail in Part II of this r next month. This first installment is de- e, switches, trolleys and related accessories. or type of industry that does not use mono- in system or as an auxiliary installation in ment. Thus monorail is extensively applied receiving, processing, fabrication, assembly



GIRDER RAIL, also supported by hanger and suspension fitting (b). (A) Shows how top flanges and rail sections are joined with a lapped splice for increased strength.

al trucking system

ports, are made by welding a large T-section of mild steel to the stem of the hard flange track. In some cases, the assembled rail is made up of twin sections bolted together back to back to form a solid unit.

Self-locking clamping bolts are used. This type is often used in connection with track hangers which are clamped solidly inside the rail head. In lieu of this (on sections of "I" or "T" shape), clamps are used. Support is obtained from the grip to the top flange of the track.

Importance Of Curves

Sections of monorail track may be bent or fabricated into right, left, or S-curves for suitable movement of trolleys along their lower flanges. They are made in standards to suit the various types of switches and for the common turns in monorail layouts. Special curves are made to suit specific installations and sometimes are bent from straight sections at the time of erection.

Curves offer the following advantages: 1. Greatly increased flexibility in track layouts. 2. Last-minute changes in layout are easily effected.

Rail benders are available and are specially valuable in the field when, at the time of erection, slight variations and adjustments may be necessary. Benders can be mounted on posts, columns, or in any other convenient manner, and the rail bent to the desired radius.

TABLE OF HANGER SPACING FOR STANDARD MONORAIL

	TROLLEY LOADS	ONE TROLLEY ONLY	TWO TROLLEYS	THREE TROLLEYS	FOUR OR MORE TROLLEYS
Aggregate Distributed Load	250 500 1000 1500 2000 2500 3000	These hanger spacings are for straight runs. Hangers should be arranged to come within one foot either way from the center of lap splices.			10 10 8 6 5 4 3½
Two Wheel Trolleys	250 500 750 1000	10 8 6 5	8 5 4 4	6 4 3½ 3	5 4 3 3
Four Wheel Trolleys	250 500	10 8	8 5	7 4½	6 4
	500 750 1000	8 7 6	6 5 4	4½ 4 4	5 4 4
	1250 1500	4½ 4	3½ 3½	3½ 3½	3½ 3½
	1000 1500 2000	6 4½ 4	4 3½ 3½	3½ 3½ 3	3½ 3½ 3
Eight Wheel Trolleys	1000 1500 2000	7 6 5	5 5 4	5 5 4	5 5 4
	2500 3000	4 3½	4 3½	4 3½	4 3½
	2000 2500 3000 3500 4000	5 4½ 4 3½ 3	4 4 3½ 3 3	4 4 3½ 3 3	4 4 3½ 3 3

TABLE OF HANGER SPACING for standard monorail. Dimensions given are for estimating purposes only, and to give an example of distance between track ceiling supports. This sample does not cover specifications of all manufacturers.

Suspension Fittings, Safety Factor

Fittings are of many types. They are designed to grasp each of the many types and sizes of monorail tracks. These permit movement along the track, at the time of erection, to suit the location of overhead support points. Standardized clamps and fittings are made to suit the common types of ceilings and roof members. A threaded rod is often used between the ceiling fittings and the track hanger, allowing for adjustment to the desired level.

Hangers should be properly spaced to support the specified load and should support the track against undue deflection. They also provide a means for vertically adjusting the track to provide for level erection, with provision for any necessary adjustment after the system has been in operation. All suspension fittings are designed with an adequate safety factor.

Other types of fittings include cleats and buckles which are attached directly to the ceiling or any horizontal surface; rigid hangers which provide direct support to the track without any variance; wood beam brackets equipped with heavy barged nails and bolts, which are used when support is obtained from wood beams; and suspension buckles, used in connection with rods for trussing long spans or bracing against sway. End stops, which are bolted into space, are designed as a protection against trolleys running off track ends.

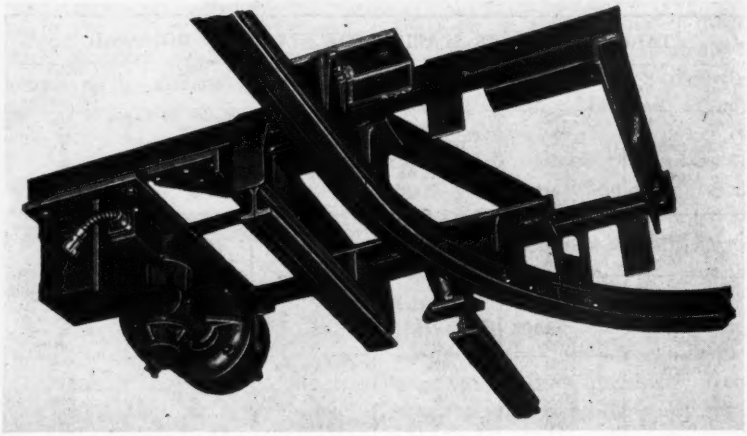
Switches For Flexibility

Switches include the swinging tongue type, sliding type, and cross tracks. They permit transfer of traveling trolleys from tracks at right angles to each other. Additional flexibility is provided by turntables, which are described in the next section.

Safety guards are usually installed as an integral part of the switch to prevent carriers from running off open rails, regardless of the position of the switch. The moving part of the switch is designed to remain securely latched in position so that movement of the switch is possible only by the use of a hand operated pull chain or rope or by means of electrically or mechanically operated pulling devices.

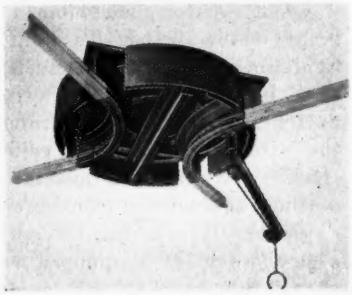
Tongue switches are available in two-way and three-way models. The first allows either right-hand or left-hand movement in addition to continuous straight-line travel. Switch members to which connecting track is attached are provided with lugs fitting into notches in the track. The principle of the tongue switch is that only the track section is moved to line up with the corresponding rails. "Y" switches (also offering two-way movement) furnish connection

MOTOR-OPERATED TWO-WAY SWITCH may be controlled from remote points or from cab units by means of a gear head motor, a part of the switch.



with diverging lines of either side of the center line of the switch, but afford no straight-line travel.

Three-way switches afford both right and left-hand connection in addition to straight-line travel. The majority of these switches are equipped with latching features.



THREE-WAY ROTARY SWITCH permits straight-line, right or left travel between a series of connecting monorail tracks.

When the switch tongue is moved from the right or left-hand rail or to the center position, it latches positively in the intermediate position, requiring another pull of the rope to release the latch and move the tongue again.

Glide switches may similarly be classified as two-way and three-way. The principle employed here differs from the tongue type in that the intermediate track section is included on the switch proper, and the entire switch moves in lining up the desired members. Two-way switches employ directions of both right and left-hand in addition to the continuous center line. Positive latching is also available with glide switches.

When it is necessary for two lines of monorail to cross at right angles, the cross track switch provides for through travel in either direction or for shifting from one track to the other. By means of a cross track switch, special long load bars with a two-wheel trolley at each end can be switched from a straightaway line of travel in a single track to cross operation on parallel tracks. They are not, however, intended to serve as turntables to rotate carriers. Two pull-ropes hang from a crosstrack, and a manual pull on either of these will release the latch and rotate

the track to the opposite position.

While many switches are actuated by manual pull ropes, conveniently reached from the floor level, certain types are also motorized. They may be operated from remote points or from power driven cab units.

One manufacturer offers a two-way motor-driven glide switch. The switch throw is positive from a rigid arm anchored to an actuating cam. By passing over limit switch buttons, this cam also determines the extent of throw for perfect track registry and is adjustable at all times through the motor brake.

Another type is the three-way rotary switch. It is equipped with curved members as well as the standard cross-pieces, which permit trolleys to run onto rails at a 90° angle to the track on which they were originally riding.

Turntables Shunt the Loads

Assemblies consisting of monorail track sections mounted on center pivots or circular tracks, and which will receive and rotate with

monorail trolleys, are referred to as turntables. One or more monorail runs radiate from the turntable for entry and removal of trolleys. They are designed for turning carriers end for end on a monorail system, or for switching carriers between several radiating tracks.

Turntables are especially useful when a direct right angle turn is desired, where conditions are so crowded that the placing of a group of standard switches is impracticable. The shifting or revolving member, supported by bearings, operates easily and smoothly while carrying a trolley. Swivels can be provided between trolley and load, so that the turntable can operate without changing the load's position.

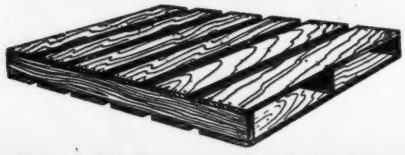
Turntables are available in both standard and larger sizes in order to effect longer trolley clearance and greater load carrying capacity. Safety guards are provided to prevent trolleys from leaving open track ends. Tracks are also equipped with locking devices, such as those furnished on switches.

Turntables are useful devices for simplifying monorail arrangements in certain operations. One turntable, for example, may receive all loaded carriers emerging from a manufacturing department, then shunt them to a feeder line from which simple pull switches connect to numerous parallel storage rails. In this particular example, the feeder line extends to the left and the right of the turntable. However, turntables offer certain limitations in that the trolleys must be stopped and started. Travel is uninterrupted through switches.

Monorail Lifts—Vertical Movement

Monorail lifts are sections of track, inserted in continuous lines, which receive whole carriers and lower and raise them, as for dipping into tanks for processing. Vertical movement of the dipping section is accomplished by means of a hoisting unit built into the structure. Electric hoists and hydraulic or pneumatic cylinders are commonly applied. Operating in struc-

(Turn to page 52)

ON THE  PALLET

NEWS · VIEWS · TRENDS

THE 1949 edition of the Material Handling Exposition will be held in Philadelphia's Convention Hall, January 10 to 14 inclusive. The show has, in three years, become one of the largest annual industrial expositions in the country. To date, the show management has received registrations for over 200 exhibitors, with a complete sellout expected by show time. This year's show will be jointly sponsored by the management and material handling divisions of the American Society of Mechanical Engineers and the Material Handling Institute. The ASME groups will conduct a five-day conference on material handling concurrently with the Exposition, and a material handling theatre will exhibit late films on handling subjects. Make plans to attend now. Get set for the third—the Third Annual Material Handling Exposition.

EDWIN J. HEIMER, former president Barrett-Cravens Co., has joined Clapp and Poliak, Inc., exposition management, as vice president in charge of its newly opened San Francisco office. Heimer was associated with Barrett-Cravens for 29 years and directed the campaign which won that company the Associated Business Papers 1946 industrial award. He was chairman of the National Material Handling Show in 1947 and 1948, has served on exposition committees in many industries, and is a member of the Exhibitors Advisory Council.

THE American Management Association has announced the resignation of Henry J. Howlett, secretary of the AMA for the past 13 years, to become president of the Container Laboratories, Inc., packaging and packing engineering consultants. Howlett has directed the AMA's National Packaging Exposition and will continue to be active in this function as a member of the planning council of AMA's packaging division.

HARRY H. BARBER, chairman of the board of the Barber-Greene Co., manufacturers of material handling machinery, died recently. He was one of the pioneer designers of modern construction equipment, and retired as president of the company in 1945 to become chairman of the board.

FREDERICK C. GIFFORD, former executive and director of Acme Steel Co., died recently. Gifford came to Acme in 1918 after serving as secretary of the National Wooden Box Association and as emergency director of the Wooden Box Industry during World War I. He retired from the company in 1941 because of ill health.

"HANDLING Adds Nothing to a Product but Cost" was the subject of a recent talk by J. L. Shields before the American Society of Tool Engineers. A description of material handling was given with examples. Handling in the average plant prior to World War II was described, also the effect of the recent war. The subject was brought up to date with modern adaptations. A discussion of various material handling equipment, capacity, use and comparisons concluded the meeting.

A MATERIAL Handling and Packaging Conference having far-reaching significance to industry, the armed services, and the nation, was held for leading industrialists and military personnel at the Naval Supply Depot, Bayonne, New Jersey. The conference was sponsored by the Navy's Bureau of Supplies and Accounts and the Navy Industrial Association. Recent techniques developed by the Navy and the Navy Association were emphasized. Standardization of equipment, utilization of the palletized or unit load, and the use of mechanized material handling were stressed.

U. S. RUBBER Co. has been awarded a contract to supply 12 miles of conveyor belt for the $100 million Hungry Horse Dam which will be constructed across Flathead River near Devil's Elbow, Montana. The belt will transport approximately 5,600,000 tons of sand and gravel to the dam site from gravel deposits located five miles away. Ten sections of belting, each one mile long, will be used for the main conveyor lines. The majority of the belting will be 30 inches wide. About two miles of belts in miscellaneous sizes will also be used on the project.

CLEARANCE of air express and freight shipments through Mexican customs has been reduced from days and weeks to a matter of minutes. This has been made possible by the establishment of a new customs office at the Torreon airport, which is owned and

(Turn to page 81)

How to Save five ways on Packaging

Read how Acme Steelstrap enabled maker of aluminum garage doors to save materials, labor, freight costs, inventory, and damage claims.

Tubular Aircraft Products Company, Los Angeles, make these popular aluminum garage doors.

Management considered their previous method of packaging too slow and expensive.

After consulting with an Acme Shipping Specialist, the company adapted Acme methods to bring about this 5-way saving:

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CHICAGO

MONORAIL

(Continued from page 49)

tural towers, either open or enclosed, they may be used to transfer carriers from a monorail system on one floor to a system on any other level of the building. In this way loads can be raised from floor to floor without rehandling from the original carriers. Discharge of carriers from the lift, return of lift section to loading level, as well as complete cycles of operation are accomplished by simple automatic devices. Here, too, safety features protect all open track ends.

Trolleys and Suspension Fittings

Successful operation of an overhead handling system depends largely on the parts that move. The most important considerations with respect to trolleys are strength and ease of propulsion. Trolley wheels are single flanged units of hardened steel or chilled cast iron, fitted with anti-friction bearings, stub axles, and lubrication fittings. Wheel asemblies may be replaced conveniently. In many instances four or eight-wheel trolleys are equipped with bumpers so that two or more of them may be pushed along the track, one against the other, without binding the wheels. Swivel joints are installed for smooth travel around curves.

Trolleys are available with two, four, and eight wheels, with capacities ranging from 250 to 12,000 lbs. Each pair of wheels is mounted in a forged steel or malleable iron yoke, with its flanges spaced to suit the running flange on the track. A four-wheel trolley consists of two two-wheel trolleys carrying the ends of a load bar, or of four wheels mounted in a single, rigid frame. An eight-wheel trolley consists of two four-wheel trolleys carrying the ends of a longer load bar. All wheels take equal share of the burden.

Load suspension fittings distribute the carrying weight evenly to all wheels of the trolley. When four-wheel trolleys are used, hooks, eyes or swivels are attached to the load bar carried by the two pairs of wheels. With eight-wheel trolleys, the fittings are attached to the main load bar which itself is attached to the shorter bars. The load itself may not come in actual contact with the fittings, but may in turn be supported by slings, grabs, buckets, skips, links, etc.

Electrification

While some trolleys are moved manually by operators, or used in conjunction with the gravity principle, many are powered electrically. Electrification is also necessary when powered hoists must be used. When a system is operated with electric carriers, electric power is supplied to these units by means of conductors, mounted parallel to the rail throughout its entire length. They are held by means of insulating supports so that the conductor bars will be properly spaced electrically.

Monorail manufacturers follow standards which are designed for economy of operation with safety. Ingenious, time-saving electric devices are available. An example are automatic door opening and closing devices for operations where electrified rails extend through doorways. These are usually used in conjunction with automatic dispatch units, which are described in next month's article.

Special Equipment

There are many types of auxiliary equipment which can be used in conjunction with monorail systems. They include scales, hoists, tractors, and others. A simple monorail section, long enough to hold a carrier, can be inserted in the track system and attached to any standard weighing mechanism. Loads travel over the section in original containers and are weighed by manual or automatic operation of the scale. Accurate control can be maintained instantaneously with no rehandling.

Hoists are an integral part of

many monorail installations. They are mounted on four or eight-wheel trolleys, and their horizontal movement is controlled by the same power which motivates the trolley. Vertical movement may be controlled by electricity, motor, air cylinder, or manual operations.

Special equipment is determined by the needs of the individual plant. Consultation with competent engineers is advisable whether special or standard monorail equipment is being considered. Plans should be thoroughly studied in relation to the points listed under "Track Selection". When an installation is made with a complete knowledge of the job to be done, the effort will be well rewarded in time and cost reduction, a minimum of physical effort, and faster and more efficient handling.

There is practically no limit to the possible arrangements of overhead trackage for various layout and production requirements. It may consist of a continuous straight line, one or several closed loops, a series of parallel rails connected by cranes, turntables, or switches, or an intricate network of crossing tracks, with branches extending over side areas. The latter may serve receiving, storage, fabricating, processing and shipping operations of an entire plant. Monorail systems also frequently integrate several buildings of one plant.

Indeed, the flexibility of monorail is sometimes not completely understood. This is even possible with a single-track system, on which several types of carriers are operated. Manually propelled carriers can be used over sections where point-to-point service is required on short moves. This may be either in fabricating or in temporary storage. On the same rail, from the place where their serviceability ends, electrically operated floor-controlled or cab-controlled carriers can continue. Then, on a long run between buildings or departments (continuing along the same rail) an automatic dispatch unit can be sent along the way unattended. The various types of rolling equipment will be described in next month's article.

ACKNOWLEDGMENT

The data and photos appearing in this article were furnished through the courtesy of the following companies: The American Monorail Co., The Louden Machinery Co., and Cleveland Crane and Engineering Co.

TIME STANDARDS . . .

(Continued from page 26)

ment of standards was presented by certain line feeding operations. One detail in this respect is the determination of trips that may have to be made in cases where the floor space is not adequate for complete pallet loads of material, or where the nature of the product (as very small washers) makes space allocation difficult. This part of the program is being studied.

Benefits and Special Considerations

The major benefit is of course in the *control* obtained over these in-

direct operations which were heretofore not considered subject to such control. Thus the supervisor of the non-productive receiving and disbursing operations has the same advantage as the supervisor of the direct or productive functions. Now the non-productive supervisor, too, can check his operators' performance against his standards. The specific advantages, set out in the six major points listed at the beginning of this article, leave no doubt that the resultant reward makes the effort worth-while.

Any innovation must overcome the hurdle of inertia, the opposition offered by people with skeptical attitude toward anything new. We, at Cadillac, were fortunate in the cooperative attitude of our supervisory operating personnel. The supervisors received a thorough course of training in the use of the standards system. This training did two valuable things. It gave the men a better understanding of the services of the Standards Department, and it helped the supervisors to recognize those situations in their own departments which may have been causing inefficiency.

In the early days of the new system, the weekly percentage of efficiency was well below one hundred percent. But after some weeks of experience with the system the percentage went to one hundred percent, and at times it goes slightly above this figure.

Supervisors are no longer harassed by a haphazard obligation to "keep men busy". The established standard for each job makes manpower allocation a matter of applying intelligent controls, which gets the work done without confusion or waste effort. The yardstick of time standards has eliminated guesswork.

The work is easier for the men, too. The original survey considered effective handling equipment as well as methods, and better tools were provided wherever necessary. As a result, strenuous lifting tasks and other forms of physical exertion were eliminated. A further consequence is that the operating personnel is making efforts to beat the standard by suggesting better ways of doing the work. A number of these suggestions were accepted after test and proved most valuable in terms of easier and more economical performance.

Each supervisor gets an efficiency report daily, and thus has an *immediate* check on performance in his department. Lapses can be checked, and corrective measures applied at once. In effect, time standards amount to a contract to perform a job at a given cost, which is essential to a profitable operation.

I believe the results obtained amply demonstrate that indirect operations can be timed—successfully.

In the September FLOW article, New Light on Neon Sign Fabrication, page 30, the following credit line was inadvertently omitted from photos: Building by the Austin Co., Engineers and Builders.

MODERNIZING A WAREHOUSE

(Continued from page 34)

personnel; the other a regular inter-plant telephone system connected with each floor as well as key personnel. In cases of urgency, the loud speaker permits cutting in on key personnel when inter-telephone communication is being used. Plans are now being made for telephone units to be placed on elevators, permitting communication while they are in motion. This will save many costly movements.

More detail could be given on innovations that were effected, but this outline of the major methods developed will suffice to show the approach taken to the over-all conversion problem. The economies of pallet handling are inherent in such an operation; but, depending on the effort made, the results can be mediocre or outstanding. The consistent study of all the ramifications and possibilities, together with the development of adequate methods tailor-made for each requirement, put the outcome on the "outstanding" side as far as the economies are concerned that are ultimately obtained.

Final call . . . the Flow Cost Analysis Contest closes November 15. Get your entry in the mail immediately.

PACKAGING MECHANICS SECTION

A regular monthly section in which are presented solutions to the problems of efficient filling and handling the boxes, cartons, bags, bottles, cases, etc., used in commerce and industry.

CONTENTS

World's Largest Nailing Machine . . .

Nails Boxes 14 Feet Wide

This box nailing machine, believed to be the world's largest, has increased box production about 28 per cent at this plant of Libbey-Owens-Ford Glass Co.

THIS giant box-cover making machine is enabling the Libbey-Owens-Ford Co. to balance current packing and shipping operations with its production schedules of plate glass. The machine was installed in December of 1947 and is in operation at the company's Rossford, Ohio, plant. It furnishes all top and bottom covers for this and the nearby Thermopane plant. Seventeen feet long and 11 feet high, this giant is capable of turning out 360 168-inch-wide box covers during an eight-hour day. (Large sheets of plate glass take a big box!) Two years were required in building this king-size model, which consumed 22½ tons of steel, brass and precision parts. Although box nailing machines have been used for some time in many industries, the size of this model makes it unique.

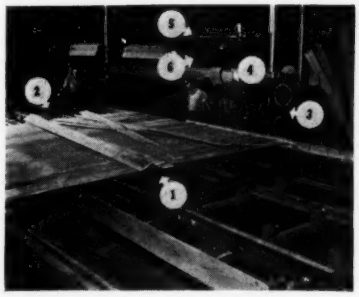
Boxes are made specifically for the orders to be shipped, and hence the machine is not run at full capacity. This could only be done in the event the bottom covers (of uniform size) were stockpiled after leaving the machine. Instead, they are nailed, to the individual box frames (of varied, predetermined sizes) as they are produced.

From Conveyor to Finished Box

Incoming lumber for the box covers is sized and stacked near

WORLD'S LARGEST MACHINE for nailing box sides. Battens up to 168 inches are nailed at one time.

the loading conveyor of the nailing machine. This conveyor consists of chain-mounted flat steel bars. These bars are positioned vertically on their sides as they advance the lumber, and drop into a level position as the wood reaches the powered rollers of the feeder conveyor. The latter delivers the lumber to the pressure hammers.



LOADER CONVEYOR (1) sends hardwood to feeder conveyor (2). Photo also shows control panel (3), saw (4), nail hoppers (5) and nail chutes (6).

When the machine was first installed, only the roller feeder conveyor was used. Following a study, however, it was realized that the lumber for one cover could be assembled on a separate conveyor while a second cover was being nailed. The 11′ x 14′ loader conveyor was subsequently installed, with the result that the machine's output was increased 33 per cent.

Battens or crosspieces for tying the box covers are pre-cut to specific lengths up to 168 inches, but the longitudinal hardwood slats may be of random lengths. There is no limit to the length a cover can be made. Covers are used which are wider than 168 inches, but they are constructed by splicing two of the smaller size. The hardwood slats are evened up at the beginning of the operation by sliding them against the stationary truing bar just ahead of the automatic hammer.

When the slats have been lined up, the first batten is laid across the members, as shown, and the pressure hammer is applied. This operation is continued on each of a specified number of battens for each box, until the required size is reached. Next, an automatic saw, which is part of the machine, rolls across the slats and cuts them to the required length. The final batten is then placed and hammered down.

The completed cover is slid from the gauge platform at the rear of the machine and onto a series of vertical posts, each equipped with roller steel bearings on their carrying surfaces. These posts are on 30-inch centers, with the last row approximately 24 feet from the machine.

Just to the rear of the posts are horses on which the box frames (or sides) are spiked together by hand. The bottom cover is nailed on here and the semi-finished box, together with the separate machine-nailed top, is trucked to the packing room. Here, after being loaded, the final top nailing is completed.

54 Nails at a Time

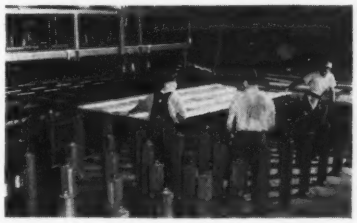
The box cover nailing machine can hammer 54 nails at one time in either a straight or staggered line. Six-penny blunt-point box nails are used. The six nail hoppers have a capacity of 10 pounds each, and must be filled every four hours.

A continuous 40-degree tilting action by the hoppers causes the nails to feed one at a time down a slot into a cam-driven slotted disk. As the disk rotates, one quarter turn, a nail drops into the nail chute and travels to the chuck or driver. When the machine is tripped, a central beam pushes all chucks down, driving the nails into the wood. At the same time another nail drops into each tube. Each of the six hoppers has nine feeding tubes, giving a total of 54 nails for securing a full 164-inch batten.

The machine is electrically driven and is operated by one man from a control board located at one end. This mechanism operates the hammer, the nail hoppers, the truing bar, the trimming saw, and regulates the speed of the two conveyors.

Different Box Structures

Usually 850 to 900 feet of glass, weighing 2800 to 3000 pounds, are shipped to a box. Heavier type boxes and additional battens are used for export shipping or where indicated by the type of glass. For example, for the domestic shipping of standard ¼″ plate glass, once-inch battens are used with 1½″ pine frames and ½″ hardwood sides. For export shipping of the same glass, one-inch battens are used with two-inch frames and one-inch sides.



VERTICAL POSTS equipped with roller steel bearings facilitate the removal of the finished box covers.

With the earlier manual nailing of these covers, prior to last December, packing production difficulties resulted. This in turn brought on storage problems. The giant machine affords considerable flexibility since it can nail covers in a wide range of sizes up to 168 inches in width. Nail chucks can be shut off when narrower covers are made. Another advantage is that two narrower covers can be nailed simultaneously, provided that they can be run through side by side.

Since the machine has been in operation at Libbey-Owen-Ford only a few months, all of its benefits have not yet been ascertained. Box production increase of about 28 per cent is a certainty. Other benefits are likewise expected, since the extra time consumed with previous hand sawing, truing, and nailing is no longer a factor. The elimination of a number of other incidental handling tasks, a part of the former manual operation, will also enhance the value of the machine.

FILLING RICE
in Non-rigid Containers

Filling rice in non-rigid containers—a new development pioneered with excellent success by United Rice Milling Products Company, Inc., of New Orleans, La.

IN RECENT years consumer demand has grown for food products packaged in larger containers which offer a greater relative economy than the small package. The United Rice Milling Products Co., Inc., New Orleans, La., installed modern packaging equipment to satisfy this demand. Automatic and semi-automatic machinery for filling and sealing three-pound paper bags at the rate of 45 per minute was combined with baling equipment that sews 20-bag bales automatically.

Continuous material flow lines integrated into the production layout reduce manual operations to a few functions. The following paragraphs set forth how packaging and material handling engineering produced a low-cost per-unit operation which is enabling the company to cope with marketing and competitive conditions.

Equipment Adapted to Existing Building

Existing building facilities had to be utilized because they could not be changed without an excessive expenditure. The only room available for packaging was a long, narrow one. It was only fairly well suited to the operation. This factor was overcome by a layout that conveyed the material in seven different directions without crossing once. These various lines are shown in the accompanying flow sheet. The rice is fed to the start of the rambling line from huge overhead storage bins which discharge by gravity chutes. The material is thus delivered to a secondary hopper which is attached to the top of the bag filling machine. Directly beneath are located six weighing hoppers of one-pound to five-pound capacity each. These are beam type scales and are set to the desired amount for each bag, and the machine is equipped with three funnel-shaped chutes that direct the rice from the weighing hoppers to the package.

This fully automatic machine is equipped with two magazines of 200-bag capacity each. A roving operator replenishes the supply once every eight minutes. The bags used are the satchel type white kraft duplex, which have ample strength for the load and service required.

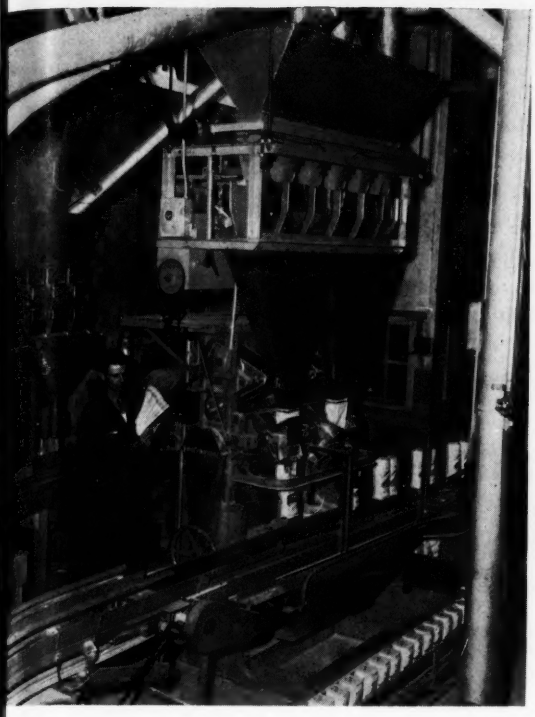
A special mechanism removes the empty bags from the magazine and positions them under the filling chute. A duckbill grab is inserted into the bag to grasp and remove it from the bottom of the stack. The grab is mounted on a revolving drum which lowers and then raises the empty container to deposit it into the hinged filling spout. Just before it reaches this point, two fingers crease the bag bottom as it is rotated past this point. The creasing action assists in opening it sufficiently for filling purposes. The hinged spout holds the bag in position while the rice drops in, and actually intercepts the empty bag as it is rotated and then releases the full container by dropping it on traveling belt. One of the photos shows that this machine is a duplex type, equipped with two of these feeding and filling mechanisms.

Bag Forming and Sealing

When the filled bag is released on the belt it has a rounded contour because of the relatively fluid condition of the rice kernels. To effect a squared shape conforming to that of the package itself, the bags pass from the take-away belt into a vibrating or shakedown conveyor. This consists of two parallel powered belts, set perpendicularly, which grasp the sides of the bags and hold them while the entire unit vibrates. The squared containers are then ready for the top closing and sealing.

A fully automatic machine is used for this purpose. The bags are deflected from the belt conveyor into a positioning fixture one at a time by a pusher which is synchronized with the top sealer. The individual bags are picked off by one of a series of pockets mounted on a revolving wheel. The pockets serve as holding fixtures while the wheel is a positioner that moves the bags through the phases of the closing and sealing sequence.

As the bag is removed from the positioning fixture by the upward and forward movement of the wheel, a semi-circular glue dauber, shaped to conform with the design of the bag flap, applies the adhesive to the inside of the end flap. The outside end flap is then de-



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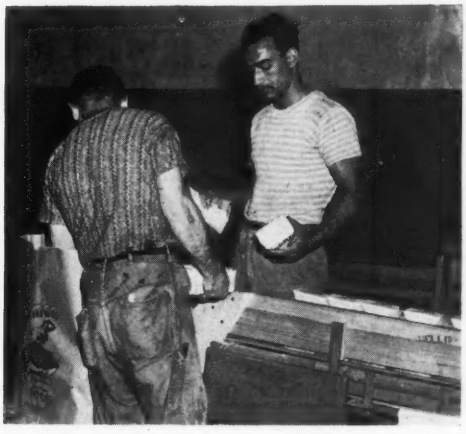


3

1 BAG FORMING and filling operation. Operator places folded flat empties into magazine. Balance of operation is automatic. Note funnel and chute system.

2 LOADED BAGS are formed, sealed and then compressed. (1) Vibrating bag former; (2) top folder and sealer; (3) compression unit.

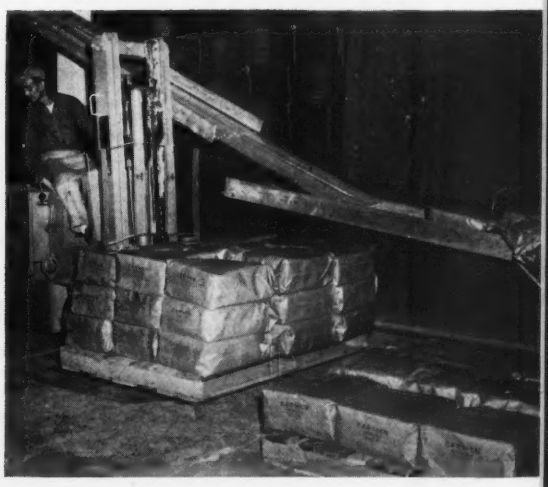
TWENTY THREE-POUND BAGS are loaded in large paper shipping bale. Loading table and conveyor system minimizes manual effort.

4 SEWING MACHINE RIG utilizing a standard sewing head to make an automatic bale former and sewer. The operation is performed on the belt.

5 CHUTES LEADING FROM the main conveyor belt allow the bales to be deflected onto pallet loading tables throughout the warehouse. Fork truck travel is thereby kept at a minimum.

4

5



pressed against the surface already glued. This completes the first half of the operation. The two flaps are then flared out to receive adhesive and are subsequently folded in by additional flared guides, completing the sealing. As the pocket-equipped wheel completes one half of a revolution, the sealed bag slips out onto a belt conveyor. The freshly glued end is down, and in this position the bag travels into a compression unit.

Bags Made Up Into Bales

From the compression unit the three-pound bags pass to the baling station, where two operators remove the individual packages and place them into three-ply paper bags, called bales. Twenty three-pound bags make up a bale.

Top closing of the bale is the final packing operation. A clever sewing machine adaptation, specially designed by United Rice engineers, was developed for this purpose. The first part of this equipment consists of a top former that holds the top of the bale in position for sewing. This device is a motorized "V" belt arrangement running between a number of sheaves which grasp and hold the bale tops. (See photos.)

The second part of this machine is a converted sewing machine head mounted sideways in a custom-made stand. As the bale approaches the sewing machine (on an 18-inch conveyor belt), it trips a lever switch located just above the conveyor. This causes the sewing head to start. As the sewed bale emerges from under the sewing machine, another lever switch is tripped in order to stop the equipment. As the conveyor belt advances the bale, the thread is severed by a cutter. Since the entire operation is automatic, the operator's only job at this point is to guide the bale tops into the forming belts.

Portable Conveyor, Pallet Method

Because of the crowded condition in the packaging room, the bales are immediately removed to the warehouse on an inclined portable belt conveyor. There they are loaded on 48" x 60" wooden pallets, 27 bales to the load. A 2000-pound capacity fork truck (equipped with a safety fork back rest to assist in high stacking) removes and stows the loads. Maximum storage capacity results from the utilization of air rights.

The methods and equipment described in use at the United Rice Milling Co. is paying off. The entire movement of the rice, from finished bulk storage to the stored packaged material stage, requires only six operators. A continuous material flow is maintained despite original building handicaps, and handling devices perform all heavy transporting tasks, permitting operators to concentrate on production jobs.

(This is the first of two articles on packaging and handling operations by the United Rice Milling Co., Inc.—Ed.)

PACKAGING AIDS

The Ice Industry

Smart lithographed bags of ice cubes have given the ice industry new sales outlets. The package has made for (a) convenience, (b) supply in desired amounts, (c) adequate protection and (d) easier handling

PACKAGED ice is providing new sales outlets for the ice industry, and the package is the main factor responsible for the growing sales volume. Ice industry merchandisers are of the opinion that the surface hasn't even been scratched—that the general availability of packaged ice to the consumer will realize new sales potentials.

Attractively packaged in lithographed bags, cubed ice for example, is now selling in new quarters—drug stores, grocery stores, apartment buildings, and beverage stores. This is the significance of the new trend—the availability of a handy package to the consumer. Statistics show that of 53,000,000 tons of ice sold in 1947, almost 2,500,000 tons were sold packaged as sized and cubed ice.

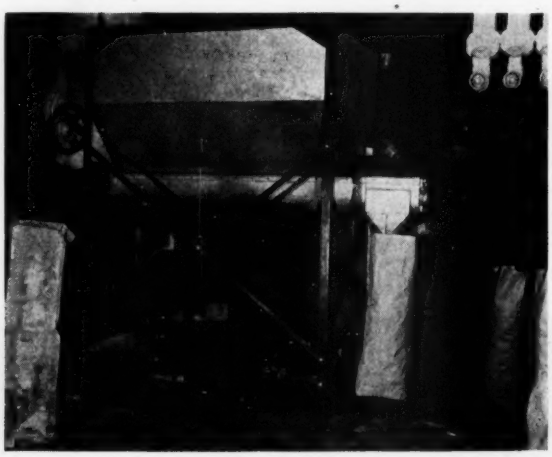
Bridge Crane Handles Ice Blocks

While the packaging of cubed ice is the main interest of this article, bagging methods used for sized ice will be indicated briefly. Ice cubes are usually available in five, 10, 25 and 50-pound bags. The 25-pound is popular for home consumption, the 50-pound is in demand for commercial use. The two smaller sizes of five and 10 pounds have been introduced more recently, and ice industry executives expect that these, because they are convenient for smaller families, will open up new sales avenues.

For the story behind this new merchandising and packaging trend, FLOW visited one of the Cleveland plants of the City Ice and Fuel Co. Because of efficient handling practices employed throughout, a brief description of

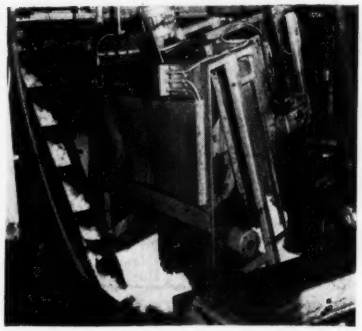
FIVE-TON CRANE lifts 15 blocks of ice from thawing tank. Cans will be deposited on the hydraulic dumper. Note swivel spreader beam.

1000-POUND CAPACITY automatic bagging machine is used for filling bags of cubes. Note the weight control mechanism at bottom.



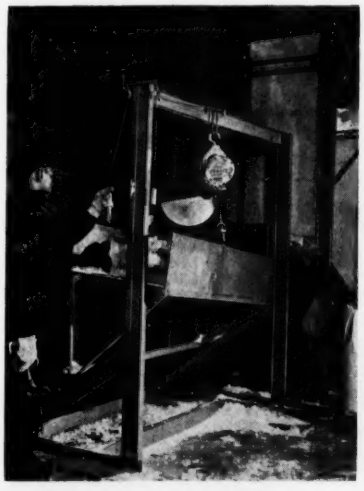
the block handling operation is included.

The cubes are sawed from blocks with an average weight of 370



FLIGHT BELT CONVEYOR elevates ice cubes from cubing machine to filling machine in next room.

pounds each. The manufacture of these blocks takes place in the tank room, 35′ x 300′, which is spanned by a 5-ton bridge crane. The individual 370-pound blocks are formed in galvanized cans, which are arranged in a connected series of 15 units each. Freezing takes place in brine-filled tanks (below floor level). The freezing tanks take up the entire floor area and each series of 15 units is covered



HALF-TON CAPACITY HOIST elevates platform to feed blocks to crushing and sizing machine.

with an individual hatch. Average production is three 15-block units per hour.

Three hooks are suspended from the spreader beam of the bridge crane, which transports the blocks to the thawing or dip tank. A brief immersion period in the 80-degree F. water loosens the blocks from the can surfaces. During this period, the operator travels the crane back and forth, which agitates the water and thus speeds the thawing action. The cans are then lifted to the level of the hydraulic ice dumper, which is directly in front of the dip tank.

During freezing, the cans are arranged across the width of the room, while the dip tank is longitudinal to the manufacturing area. The suspended load thus has to be turned 90 degrees for immersion purposes. This is done by means of the swivel type spreader beam. The load-bearing beam, as can be seen from one of the photos, is attached to a shorter one by means of a king pin and thrust bearing. The loads are thus revolved with

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Trowel a smooth, tough, malleable surfacing right over your old concrete or wood floor

Platsic Rock comes complete, packed in barrels, nothing more to buy, no application "formula" to confuse you. Simply mix and trowel right over old floors; sticks to concrete, wood, steel, average depth ½", patches concrete to perfect feather edge. Old floor Saturday, new floor Monday, hundreds of tons rolling on steel wheels only improve it, 7-year-old floors show no wear. Plastic Rock is spark-proof, skid-safe even when wet, dustless, silent, feels like cork under foot, cannot splinter, crack, crumble, curl or loosen. Used by largest industries and railroads in America. Your contractor or your own crew can apply. Not for home use.

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POWER SWEEPER

An ALL-PURPOSE power sweeper specially designed to do a thorough cleaning job both indoors and outdoors. Collects waste and sweeps ground or floor in one easy motion, reducing cleaning time and maintenance costs as much as 90%. Keeps floors free of welding rod butts, nails, chips, paper, dirt—keeps drives, parkways, lawns, runways free of papers, sand, debris.

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A ROVING LABOR GANG ON WHEELS

LOADING pipe is just one of many tough material handling jobs made easy by "cranepower" at the National Supply Co., Torrance, Calif. This single-engine, self-propelled Lorain SP-414 moves about the yard at speeds up to 7 M.P.H. Air power steering assures high maneuverability. The unit travels and works under the control of a single operator—can use more than 15 different crane attachments to handle a wide variety of work.

Lorain "cranepower" is packaged to fit your particular needs. There's a complete line of cranes in a wide range of capacities with both crawler and rubber-tire mountings (single-engine or two-engine Moto-Crane types). Ask your local Thew-Lorain distributor for complete information today.

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LORAIN CRANE HANDLING VS MAN HANDLING SAVES MONEY

a minimum of effort.

The cans are deposited on the bed of the dumper, which tilts at a 90-degree angle to discharge the 15 blocks of ice against a rubber-covered bumper which is paralleled by a floor chain with dogs. Incidentally, the dumper is located in the center of the tank room, which holds crane travel from either end to a minimum. The chain advances the ice blocks to another powered floor conveyor, a reciprocating type, with collapsible dogs, which paces the blocks through the scoring machine.

More Than 20,000 Cubes Per Hour

Blocks to be sawed into cubes are not scored and are routed left to the adjoining cubing machine. The latest type of cubing machines have a capacity of more than one ton per hour, which produces in excess of 20,000 cubes.

From the discharge end of the machine the cubes are routed via a chute to a flight belt conveyor, which transports them from the manufacturing room through a wall opening into the adjacent storage room, where the bagging is performed. The discharge conveyor inclines about 60 degrees.

The arriving ice cubes are discharged via a trough to the 1000-pound-capacity bagging machine hopper. The auger feed type machine can be set to fill automatically 25, 50 and 100-pound bags. The operator places the empty bag on the scale platform, which positions the opening at the proper level under the hopper spout. A push on the electric switch fills the bag to the predetermined amount. The full bag is tied with wire.

In the storage room the temperature is maintained at 28 degrees F., and thus there is no melting problem. The closed bags are stacked by sizes, usually on skids. Fast deliveries are made to sales outlets where refrigerated cabinets are maintained by the

HANDY FOR LAUNDRY BUNDLES

By means of a two-wheel jack handle and especially designed semi-live skid racks, the Pioneer Linen Supply Co., od Cleveland, has devised an effective means of transporting wrapped cloth-

ing. The racks are easily stored when not in use and will not roll about because of their partial support by the two stationary skid legs. The jack used fits under the skid-leg end, lifts it off the floor, thus supplying a "third wheel" for hauling. The removable boards of the wooden rack facilitate loading and unloading. A piece of pipe, secured to the top board on one side of each rack, projects outward about 18 inches and is used for hanging coats and frocks which are not bundled.

City Ice and Fuel Co. Apartment buildings were previously mentioned as one of the new sales outlets. This is one of the more recently developed sales strategies. The idea is to have the custodian serve the tenants who need additional amounts of cubes for entertaining. In ice company stations, as well as in stores, vending machines are a still further possibility.

This widespread availability of ice cubes calls for a bag that will be moisture-resistant, and which will also maintain the purity of the transparent cubes. The type of bag used is made of laminated stock and has a wax liner.

Packaged Sized Ice

In another area of the storage room, the sized ice is packed. Sized ice means various grades of crushed ice—snow, pea, nugget and egg. These are used for various commercial purposes. In this operation, the blocks are hoisted on a two-walled platform by a 1000-pound capacity hoist to the elevated feed end of the crusher. The latter has an adjustable comb which produces the various sizes of prepared ice mentioned. The crushed product is carried up by bucket elevator and discharged into revolving screen drums, which are installed over bagging hoppers. The screens are arranged in a small-to-large sequence, slightly inclined, thus delivering the crushed ice to the proper bins as fast as it is produced.

Filling is by gravity, and four openings in each bin permit the loading of the same number of bags simultaneously. The same type of wax liner bag is used as for the cubes. These bags are usually of the 50 and 100-pound size because they are for commercial use. However 25-pound bags are filled for parties, picnics, etc.

PACKAGING MECHANICS SECTION

Package Basic To Extension Of Market

Ice industry merchandisers place hopes for extension of increased package sales on the addition of the smaller convenience bags, such as the five and 10-pound units of cubes. These will lend themselves well to the planned vending machine form of distribution. At present, these smaller and attractively lithographed bags are still manually packed. However, they have already established that there is a market for them. As the volume grows, the ice industry will doubtless avail itself of high-speed bagging machines for these two sizes as well.

Ice manufacture has come a long way since the days when ice was cut from ponds and lakes in the winter, and stored in saw dust for year-round use. In those days horses and mules provided the power for cutting the blocks, which is in startling contrast to today's crane handling of blocks and high-speed sawing of cubes.

STANDARD IRONBOUND HANDLING UNITS FOR MANY JOBS

●Ironbound "stock" units are built to meet many requirements. If a stock unit will not solve your problem, an Ironbound engineer is ready to solve it for you with a specially designed unit. Check the coupon for illustrated Ironbound Material Handling literature.

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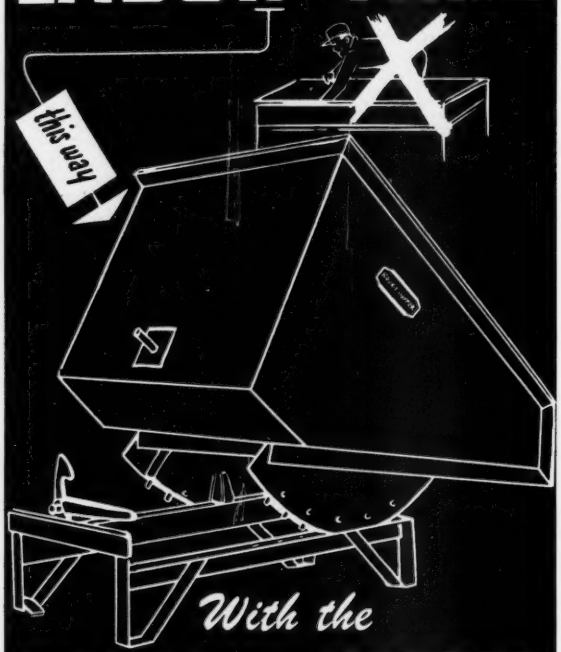

With the

ROURA *self-dumping* HOPPER

With the Exclusive Instant Release (Patent Pending) Handle

Handling wet or dry, hot or cold, bulky materials quickly and easily, the ROURA is simple to operate—only one man is required for distributing and unloading—and he does this in *much* less time than ordinarily required under old-fashioned manual methods. Thousands of Roura Hoppers (which fit any standard fork or platform lift truck) are in constant daily operation, serving and saving for such firms as Ford, Champion Porcelain, General Electric, National Carbon, International Harvester, etc.

By a simple lift of the *exclusive* release handle, the ROURA HOPPER dumps, rights, and locks itself securely. Sizes—½, ¾, 1, 1½ and 2 cubic yards; the ROURA HOPPER can also be designed for flat trucks and in other sizes to meet specifications. Also, it can be equipped with special flanges that permit stacking to desired tiers for storage or future distribution of materials—conserving valuable floor space. Priced below all competition, the ROURA will quickly pay for itself many times over.

Write today for detailed brochure, "In Dollars & Sense"

ROURA IRON WORKS, Inc.
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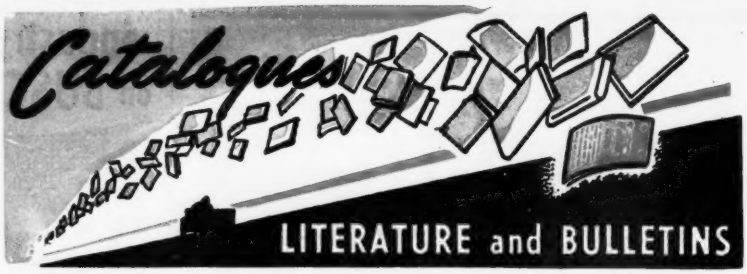


The publications featured on these pages were written by experts. They are FREE publications. To obtain these use the postcard bound into this issue.

25—Packing Manual . . . A new edition of the Speed Packing Manual is now being distributed by Sherman Paper Products Corp. 199 step-by-step photographs and drawings illustrate detailed instructions for packing a wide variety of products, from clothing and jewelry to automobile parts and prefabricated houses.

26—Belt Conveyor . . . From the Rapids-Standard Co., a two-color bulletin illustrating and describing the Press-Veyor belt conveyor. The unit is especially adapted to the movement of stampings in press-rooms and elevation of miscellaneous items in other operations. Installation photographs show how large punch press rooms use these conveyors in tandem to smooth and increase line production. Other industrial applications are included.

27—Gummed Tape Hand book . . . Better Packages Inc. has issued a 63-page handbook as a guide to faster, easier, and safer sealing with gummed tape. Among topics discussed are gummed tape for product protection; gummed tape moistening; gummed tape application; how to use and care for sealing equipment for longer life; and check lists for gummed tape users. Mailing and sealing instructions with regard to postal regulations are also included.

28—Automatic Pallet Loader . . . A four-page, two-color pamphlet, The Automatic Pallet Loader, is available from the Lamson Corp. Designed for palletizing 1200 to 1500 cases or cartons per hour, the machine can handle many different carton sizes and stacking patterns. The pamphlet shows operating principles, action photos, and lists specifications and engineering data.

29—Air Activated Conveyors . . . From the Robinson Air-Activated Conveyor Systems, a brochure describing its line of pneumatic conveying equipment. It is designed for bulk-handling of any dry-pulverized or fine-granular minerals or food products. Included are installation diagrams, photos, advantages, and industrial applications.

30—Package Sealing . . . The Story of Adhesive is the title of a booklet issued by The Gummed Products Co. Subjects included are glue and the gumming industry; how to purchase, store and handle sealing tape; and how to seal. Also available is a pamphlet with instructions on gummed tape storage, care of dispensers, and how to apply tape for maximum protection.

31—Protective Padding . . . Tufflex, a protective padding for packaging and shipping is pictured and described in a booklet from the Wood Conversion Co. Detailed description and specifications of the material is given with photos showing industrial applications.

32—Non-Electric Magnet . . . A new eight-page, two-color catalog, describing and illustrating the complete line of Eriez permanent non-electric magnetic separators is now available. Complete specifications regarding weights, sizes, and strength comparisons for various types of plate magnets are given. Also included are tables of operating capacities for permanent magnetic pulleys, drums, pneumatic line assemblies, and pipeline traps.

OPPORTUNITIES

Men wanted Jobs wanted Lines available

Rates for "Positions Wanted" $4.00 minimum for 25 words, each additional word 10c; bold-minimum, limit 25 words. For all other face type or all capitals, $7.50 minimum for 25 words, each additional word 15c; limit 50 words. Box addresses count as five words. All insertions are payable in advance.

These classified columns are not intended for the advertising of new products by manufacturers, their representatives, or their distributors. These columns are limited to Help Wanted or Positions Wanted advertisements, and for the offering of used equipment by the users of such equipment.

FOR SALE

CAR SPOTTER SALE

5 New surplus electric 5 HP car puller hoists complete with Timken bearings, bronze worm gear, ball bearing motor, sturdy steel base, vertical capstan, etc. (5000-lb. starting pull)_____$368 each
1 Same as above, except 10 HP model (10000-lb. starting pull). Handles up to six cars_____$537

AMERICAN WAREHOUSE
P. O. Box 1546 Pueblo, Colorado

Two (2) AUTOMATIC Transporters Model TW-492 with Exide batteries. Have never been in service. Box 11648.

Clark High Telescopic Tilting Gas Powered Loader, 5000 lbs. capacity, 17 foot lift, wide axle, equipped with condensing muffler and protective driver shield. Practically new; moderately priced. Box 11548.

"For Sale: Hard Maple and Birch. Can saw to order, any thickness or grade. Braman Manufacturing Co., Inc. Carthage, New York."

"BARGAIN practically unused 1946 Yale 4000# telescopic Platform truck, overall height 86" platform height in low position 6¾"; high position 125"; platform 19¾" x 43". Complete with Edison 24C7 battery and Westinghouse Rectifier 220 volt, 2 phase, 4 wire, 60 cycle a. c. R. L. Higgens & Associates, 2534 N. Broad St., Philadelphia 32, Pa.

REPRESENTATIVES WANTED

MECHANICAL ENGINEER preferably with some experience in the manufacture of materials handling equipment. Man with flare for new product design will enjoy this work. Permanent, good future. Excellent place to raise family in this medium small midwest city. Company is not too big-growing. Send complete information, late photograph, state salary in first letter. Strict confidence. Write Box 11348. Flow.

"We are interested in obtaining the agency or distribution of a major account for Philadelphia and surrounding territory. Our organization consists of a complete and modern sales office with 7 salesmen and 2 stenographers, and a fully equipped service shop and warehouse with 4 men and a bookkeeper-stenographer. We have been successfully serving industry in this territory for a continuous period of 28 years. For an account with sufficient potentialities we would be willing to devote our complete efforts and facilities." Box 11248.

Representatives Wanted—Established Materials Handling Engineers wanted to represent us in principle cities, for sales to chemical, food, ceramic, steel and allied industries. Interesting proposition. Box 11148, FLOW.

HELP WANTED

"Wanted—Foreman for materials handling—Large industrial plant, including industrial trucks, dump trucks, yard gang and freight unloading. Supervision of 80 people. Location—Connecticut. Please send resume to Box 11448, care of this magazine."

POSITION WANTED

Material Handling and Packaging Engineer now employed by one of the largest automobile manufacturers interested in change to head up Department or Sales Engineering work. Box 11748.

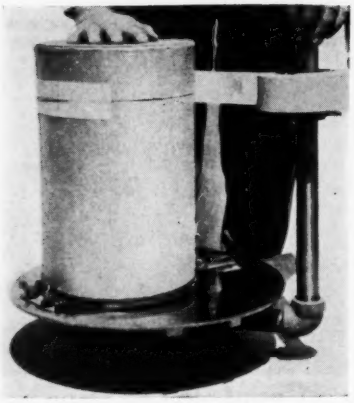
For additional information on these products, write Dept. 5, Flow Magazine, 1240 Ontario St., Cleveland 13, or use postcard bound into this issue.

WIRE ROPE CUTTER

1—A new-model wire rope cutter with a maximum capacity of one and one-half-inch wire rope has been introduced by Pell Cable Cutter Co. The unit weighs only 70 pounds and can be operated in any position, it is stated. Of all-steel construction, it is manually operated, and does not have to be anchored when in use. It cuts wire rope through the application of hydraulic pressure.

TAPE SEALING MACHINE

2—For those interested in applying standard pressure (masking) tape to drums, roll goods, canisters, cartons, etc., a semi-automatic machine is being



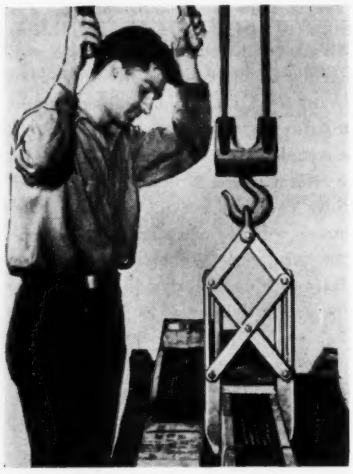
manufactured by The Lake Laboratories Co. Packages up to 17″ diameter are placed between adjustable spring clamps. One complete hand revolution of a swivel arm feeds the tape, which is then cut by a blade. The arm is available in any height up to 28″ and is mounted in an oilless bearing. Unit weighs 40 lbs.

SQUARE STACKING BOX

3—Palmer-Shile Co. is now producing a stacking box for handling miscellaneous parts. Of all-steel welded construction, it has a four-way entrance with a corrugated bottom. It is supported by four angle legs with shoes for floor protection. Square box construction permits stacking any way. Boxes are built to customer requirements.

LIGHT-WEIGHT GRAB

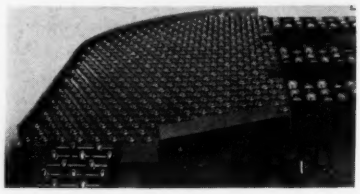
4—The "Beacon Claw", manufactured by the Cleveland Beacon Products Co., is claimed to simplify box and package handling. It is extremely light-weight yet has a capacity range of 750 lbs. to



1500 lbs. This grab exerts its own clamping pressure—the greater the load the tighter it holds. Narrow jaws allow for close stacking. The grab is made in three standard sizes: 4″ to 10″, 10″ to 20″, 20″ to 36″. Variations of these sizes may be obtained.

BALL TRANSFER TABLE

5—Designed for handling flat-bottom packages, cartons, etc., is the Sage Ball



Transfer Table manufactured by the Sage Equipment Co. The model can accommodate loads up to 10,000 lbs. It is stated that with this unit in all types of conveyors, articles may be removed for inspection or other purposes without interrupting the continuous flow. It may also be used where several conveyors or lines converge into one.

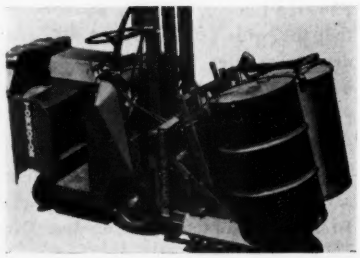
RETAINING DOORS

6—The Signode Steel Strapping Co. is marketing a one-piece retaining door designed for bulk commodity shipments. It is constructed of ¾″ x .020 steel strapping and heavy-duty, water-

repellant Kraft liner board paper. Protection against seepage is positive because load pressure against the retaining door seals the sides and bottom flap. Doors are available in three standard heights—3′, 4′ and 6′, all 7′2″ wide.

DRUM-HANDLING ATTACHMENT

7—Designed for the handling of drums, barrels and casks, the Drum-Master is being manufactured by William Ehlers. The model can be installed on any hydraulically operated fork truck and is recommended for use

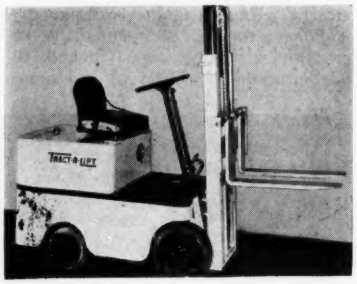


with a truck of 2000-lbs. capacity. It handles steel drums with chime clamps, and fibre and light-gauge metal drums or wood barrels by means of "T" extension arms which are standard equipment with every unit. Containers may be picked up singly or in pairs.

FORK TRUCK

8—A compact, gas-powered fork truck with 2000-lb capacity at 24 inch-

es from heel of fork, has been announced by Tract-R-Lift Corp. Measuring 28″ x 61″ x 60″ and weighing 3050 lbs., this model is designed for handling materials through narrow



doors and aisles and in cramped quarters. Turning radius inside is six inches; outside 67 inches. Single hydraulic lift-and-tilt control lever raises or lowers forks and tilts load forward or backward.

COUNTING AND MEASURING MACHINES

9—The Durant Mfg. Co. announces the addition of new "Y" Reset Stroke and Rotary Counters to its line of counting and measuring machines. The "Y" series comprises several models that are small and compact, and requires a

minimum of driving effort. They are designed for incorporating as an integral part of business, textile, and metal working production machines of all types. Both the stroke and rotary models are available in reset and non-reset styles, in three, four, five, and six figures capacity.

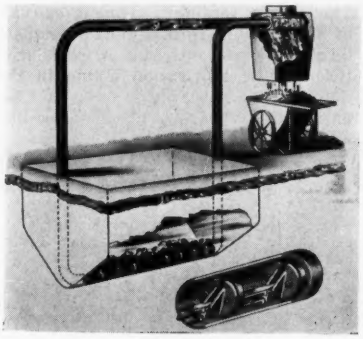
CANVAS BASKETS

10—C. R. Daniels Inc. is manufacturing a vinyl-treated canvas basket designed for the handling of textiles. Ac-

cording to the release, the canvas cannot be penetrated by oil or grease, is chip and splinter proof, and does not absorb dirt or water. It is washable, easily wiped out with a damp cloth. It is further stated that the canvas will not deteriorate in heat up to 300° F. and does not shrink.

BULK CONVEYOR

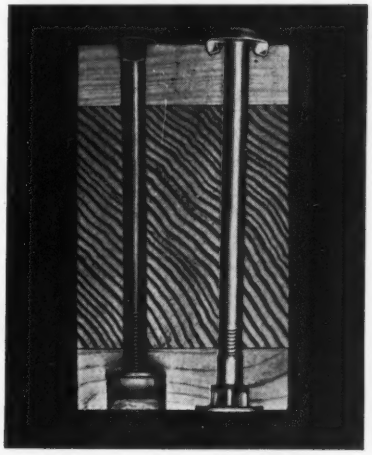
11—Elimination of manual labor in the bulk transporting of solid or fibrous material of a loose nature is claimed as one of the principal advantages of the Houdaille conveyor, manufactured by the Honan-Crane Corporation. The



conveyor is said to move any material that settles to the bottom of tanks, or for ordinary transportation. It consists of a series of neoprene flights, fixed to an endless chain and pulled through a pipe housing with a high torque gear transmission enclosed in an oil-tight gear case.

HY-C NUT

12—The East Bay Machine Works has developed a HY-C nut which comes in either plain or notched design. Included



among the features are its flush-type construction, top washer, self-centering, cadmium plated, and split-second removal. It is further claimed that the nut and bolt will not gall and that it may be assembled at high speed.

CONVEYOR BELT

13—A high-tension fabric conveyor belt called Raynile, for jobs where belt ten-

sions run as high as 1000 lbs. per inch of width, has been introduced by the Hewitt Rubber Division, Hewitt-Robins Inc. Features of the new belt include excellent transverse flexibiilty, minimum stretch in actual operation, and field splicing made easy because of fabric construction. Reinforcement of the belts is accomplished by use of plies of rayon and nylon fabric suitably bonded to each other.

FLEXIBLE CONVEYOR

14—A portable flexible conveyor for carrying boxes, crates, sacks, barrels, etc. through box car doors and to the end of the car has been announced by the H. W. Creager Mfg. Co. It is available in 20 and 40-foot lengths and operates on a continuous track principle. The conveyor can be curved into more than 90° turns, in a floor space of only six feet. The unit is flexible horizontally and vertically at the same time. Motion is reversible for loading and unloading.

TROLLEY WHEEL BEARING

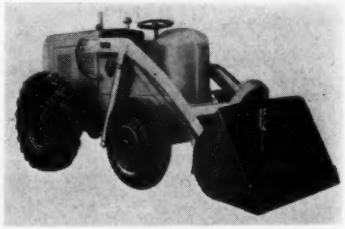
15—Jervis B. Webb Co. has designed a trolley wheel bearing for overhead conveyors which is said to retain the lubricant under any operating conditions. The grease retaining element consists of a double labyrinth seal and adequate lubricant cavity. Grease is introduced through the lubrication fitting in the hub. Lubricant easily travels into the antifriction bearing, but, according to the release, is prevented from escaping by the double labyrinth.

HYDRAULIC TRUCK CRANE

16—A new 2000-pound hydraulic truck crane has been introduced by the Cardinal Corp. This model is designed for mounting through the floor of the truck body in a rigidly braced socket. It is recommended for loading and unloading engines, large truck axles and transmissions and other loads. Heavy-duty 45-inch boom is constructed of sturdy structural steel, which folds down into frame when not in use. Range of swing is 360 degrees.

TRACTOR SHOVEL

17—The Frank G. Hough Co. is introducing an improved model of its Payloader tractor shovel. Previously equipped with hydraulic lift and lowering of the bucket, the machine now has the added feature of hydraulic bucket control which dumps and closes the bucket by fingertip actuated hydraulic power. Because the bucket can be dumped gradually or instantaneously, as desired, and can be closed immediately by the same hydraulic cylinder, the speed and ease of operation are said to be increased. It is further stated that since the bucket need not be dropped to the ground and the tractor reversed to close it, the machine and truck being loaded are relieved of the usual shock and wear.



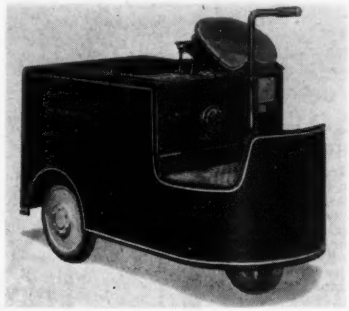
POSTAL SCALE

18—A postal scale with a specially designed dial has been introduced by the Pelouze Mfg. Co. Instead of stringing parcel post rates around the dial, they

are arranged in tabular form in the center. All readings are thus accomplished horizontally. Another feature is that the pointer has been placed behind the dial. According to the release, the dial increases visibility and lessens distraction to the users' eyes.

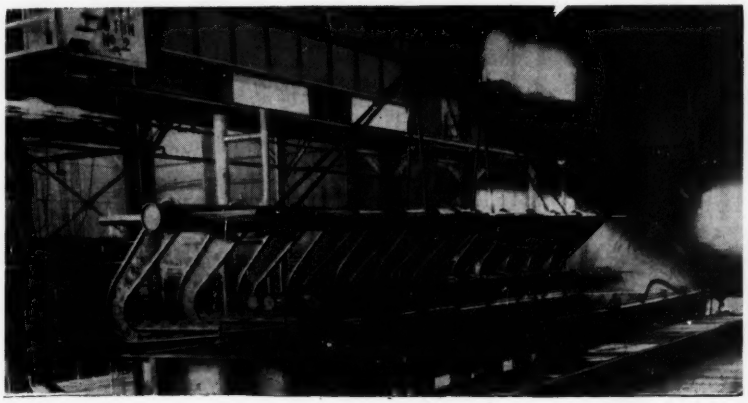
ELECTRIC TRACTOR

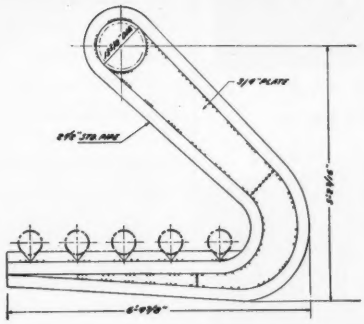
19—The Mercury Mfg. Co. is producing a new compact light-weight electric tractor to meet moderate industrial haulage requirements. The tractor is designed for use where trail-



ing loads are not to severe, and floor and elevator capacities and operating space are limited. It is 70" in length (exclusive of coupler) with a width of 34", and a maximum drawbar pull established at 1000 lbs. Weight of the chassis without power source is 1450 lbs.; power source is a low type 36 volt battery.

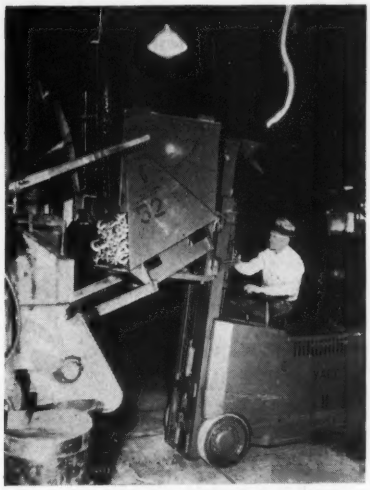
RIG ELIMINATES SAGGING— Bars in lengths from 30 to 50 feet, in diameters from four to eight inches, can now be handled during the heat treatment without danger of sagging and bending. This used to be a problem particularly with alloy steel stock. Engineers of Spang-Chalfant Division of the National Supply Co. developed the lifting rig shown, which is composed of a series of notched hooks attached to a central guide bar. The bar itself is suspended by four supports from an overhead crane. The notches on the hooks insure complete support of the pipes during the operation. Open ends of the pipes are sealed with discs of plate, welded in place so as to completely close the ends and prevent the entrance of quenching oil.





FAST SCRAP HANDLING

The power handled dump-hopper, a square metal skid bin, has its bottom hinged along one edge, and a chain arrangement controls the bottom. Since the bin is hooked to the top of the truck, the operator regulates the opening by merely lowering the fork, upon which the bottom rests. A loaded hopper can be picked up by the fork truck in the usual manner. It is transported to the dump area, hooked to the top of the truck, and then dumped as shown. **—Photo courtesy of The Yale & Towne Mfg. Co.**



ON THE PALLET . . .

(Continued from page 50)

served by LAMSA, Mexican subsidiary of United Air Lines.

ONE of the fastest self-unloading systems yet devised, including the world's largest shipboard boom conveyor, has been installed recently on the Great Lakes vessel SS. Crispin Oglebay by the American Shipbuilding Co. The new all-electric conveying system is powered by approximately 750 horsepower in General Electric induction motors. Unloading speed has been increased to 2200 long tons per hour. The high unloading rate was obtained by widening the hold conveyor belts from the 42 inches commonly used to 48 inches and the boom belt from the usual 48 to 60 inches. Its 96-inch bucket elevator speed is 100 feet per minute.

THE Rapids-Standard Co. Inc., announce the adoption of the term "RapiStan" as a trademark to designate all equipment manufactured in their line. The company, one of the largest manufacturers of conveyors, hand trucks, floor trucks and casters, formerly used a "Lil Augie" trademark depicting a village blacksmith forging on an anvil. All national and international advertising and literature produced by the company will carry henceforth the new trademark for its recognition value.

sary to satisfactorily transfer the longer lengths of lumber from the belt to the sorting table chain conveyor that runs at right angles to the unloading line. The belt is two feet above the chain at the junction, and the high speed of the belt hurls the boards out onto the chains, and changes the directional flow of the material from lengthwise to sideways. A stop plate is provided here to halt the boards at the proper point. The operation up to this point is illustrated.

Load Unit Handling

The sorting and grading table is equipped with seven strands of conveyor chain, 165 feet in length. An inspector marks each board with a symbol to designate its grade and thickness as it passes to the pull-off men. As many as eight of these men are stationed along the chain to remove the boards and place them on straddle truck bolsters. The latter are 42 inches wide and are loaded to a height of 48 inches to give an average load of 1300 board feet.

The length of the load varies, since the length of the lumber ranges from four to 18 feet.

Tractor with powered winch shifts loaded cars to kiln rails with aid of a transfer car.

The straddle trucks are equipped with electric lights and driver cabs for 24-hour all-weather operation. The truck removes the loads from the sorting table and stores them temporarily in an accumulation area. (Five bolster loads are required to make up one kiln carload, and only lumber of the same grade and thickness can be placed on a given car.) When five loads of one kind are ready, the straddle truck deposits them on a floor chain conveyor feeding the sticking and kiln car loading station. The three chains forming the conveyor are flush with the concrete roadway. Each of these is made up of three individual 2½ inch pintle chains, each running over its own sprocket, but driven from a common shaft. This construction results in a 7½-in-wide surface for the straddle truck bolsters to rest upon when released. The outside two chains are on seven-foot centers, whereas the center chains are off center one foot to give a center to center distance of four feet one way and three feet the other. This arrangement permits the use of the two outside seven-foot center chains for loads 12 feet long and over, and the narrower four-foot center one for loads up to 10 feet.

Engineered Methods Make Jobs Easy

This chain conveyor is controlled by the operator of the hydraulic lumber lift which it services. When

a load is needed, the chain is started. It travels at the rate of 50 feet per minute. The hydraulic lift that performs the next operation is one of the more recent developments in the material handling field. It not only lifts the 7300-pound load from the bolster, but also tilts it 30 degrees to assist in unloading onto the kiln car. The unit used is equipped with three 60-inch-long forks which have a maximum lift of six feet. Its capacity of 18,000 lbs., has an ample safety factor for the average 7300-pound load which it handles.

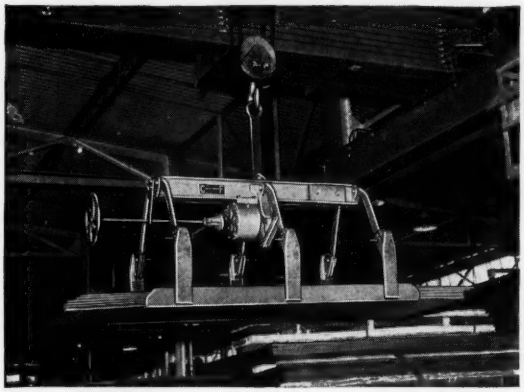
The forks are lowered into recessed pits adjacent to the three chains that advance the bolster. The operator starts the chain conveyor and moves a load on the forks. The hydraulic lift is raised to pick off the lumber with the three forks. As the load is being raised it is tilted toward the unloading position 30 degrees, and stopped when the top of the load reaches the top of the lifter mast. In this position, the kiln car is ready for loading and sticking. In one of the illustrations a tilted load can be seen being lifted to the higher level.

The kiln car onto which the lumber is to be loaded is positioned on a vertical hydraulic elevator, whose platform is 9′ x 18′ and has a downward travel of approximately 14 feet. When a kiln car is to be loaded, it is in the uppermost position. As the load is built up on the car, the platform with the car and load are lowered to maintain a convenient loading height for the operators. At the same time, the tilt lift unit with its bolster load is being raised for unloading. The tilt of this unit makes manual lifting unnecessary since the operators need only direct the sliding lumber. Sticks are inserted between each course as it is placed on the car. To speed their placement between each layer of boards, slots were incorporated into sides of elevator shaft into which sticks can be readily inserted.

HORIZONTAL CAR PULLER moves 12½-foot-high load of lumber from elevator onto spur track.

When the car is completely filled, the 12½-foot high load is raised so the level of the track on the elevator is on the same plane with that of the take away road bed. A car puller is then hooked to the load to remove it from the elevator and make place for the next load.

From this spur, the loaded cars must be moved to a series of 20 different tracks that feed the kilns. A transfer car operating on three rails, each on eight-foot centers, is used. The power for loading and unloading the 40,000-pound cars on and off the transfer car, as well as power from moving the unit up and down the track is provided by a four-wheel industrial tractor equipped with a winch.



Save Time... Save Sheets

Handle loose or bundled sheets with one of these C-F Lifters and you save TIME and SHEETS, because C-F Lifters under one man end control can handle more sheets per load safer, faster and more economically. Tong action grips loads tightly, yet design features like wide bearing surfaces give full protection to stock edges. End control of C-F Lifters permits closer stocking of piles—resulting in more efficient use of storage facilities. C-F Lifters are available in capacities from 2 to 60 tons or larger, in standard or semi-special designs.

Write for the bulletin "C-F Lifters"

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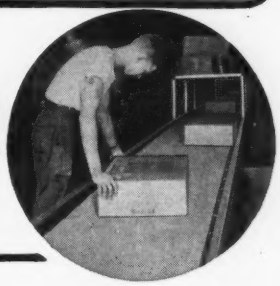

Yes, an Alvey-Ferguson *engineered* Conveyor—sections or system—will keep parts, products or packages moving in a "steady stream" throughout your plant—efficiently, inexpensively. A-F Engineers are specialists in engineering money-saving, time-saving, Completely Co-Ordinated Conveyor Systems—systems "tailor-made" for your plant. Write, without obligation, for illustrated folder—today!

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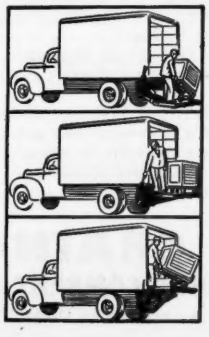

- Your trucks or trailers can be loaded and unloaded much quicker with Anthony "LIFT GATES", the field proved advance design cargo handling equipment. This means faster pickup, faster delivery—no unnecessary delays.
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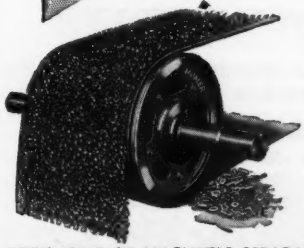
ANTHONY LIFT GATE HYDRAULIC

PLATE OR PULLEY

Homer "PERMANENT" NON-ELECTRIC MAGNETIC SEPARATORS

Available in standard widths from 4" to 26". Special sizes made to specifications. All HOMERS have self-insulating decks, with covers to protect powerful permanent magnet assemblies. Homer Permanent Magnetic Separators are "low-cost" protection against TRAMP-METAL damage.



Available in standard diameters of 12", 15", 18", 20", 24" and 30", with belt widths from 12" to 60". Homer Permanent Magnetic Pulleys can be used at head end or as idlers in belt conveyor systems and are furnished with or without shaft. Write for bulletins on HOMER "non-electric" Permanent Magnetic Separators.

PRODUCERS OF MAGNETIC SEPARATOR EQUIPMENT SINCE 1923

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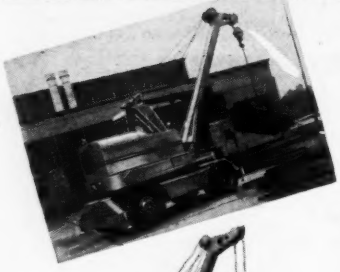
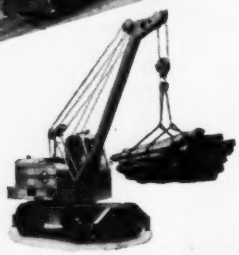
Now...the UNIT 357 MOBILE CRANE with a TELESCOPIC BOOM

6 BOOM POINT LEVELS IN 1





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- It Goes Anywhere
- It Lifts Anything
- It Has 1001 Uses

This Unit Telescopic Boom broadens the scope of your Unit Crane. The boom is easy to adjust. It can be extended from a minimum of 16 feet to a full length of 26 feet, in progressive steps of 2 feet each. Merely remove 4 bolts, set boom at any desired height, replace bolts and the machine is ready for action. It lifts—loads—and hauls from any point to any place in or out of plant. Gas or Diesel power. Write for literature.

- A WORKING LEVEL FOR MANY JOBS IN YOUR PLANT
- IT WILL NEVER BE IDLE . . . DAY AFTER DAY
- HANDLES . . . LUMBER, MACHINERY, CASTINGS, STEEL, SKIDS . . . WITH EASE

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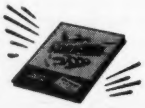

MARKET FORGE COMPANY
Material Handling Division
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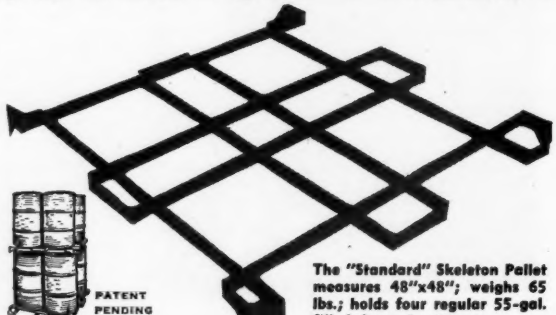
Now! an all-steel pallet designed for use with Lift Trucks...

SKELETON PALLET



PATENT PENDING

The "Standard" Skeleton Pallet measures 48"x48"; weighs 65 lbs.; holds four regular 55-gal. filled drums in storage.

The welded steel construction and semi-open framework of the Skeleton Pallet make it ideal for use in palletizing and depalletizing with fork lift truck, or by hand.

The "Standard" Skeleton Pallet (above) is designed especially to accommodate oil drums, barrels and rectangular types of firm containers.

It combines light weight, durability, low first cost and low upkeep; measures 48"x48" overall; weighs 65 lbs. Skeleton Pallets are available in several sizes or can be built to your specifications, if desired. *Write for literature.*

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Metal Bound BOX TRUCKS

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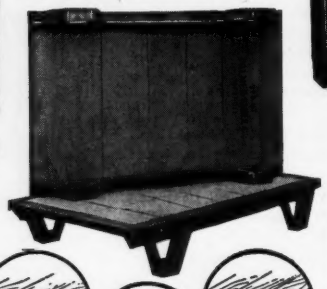
Corner stacking lugs of nesting rings lock into position on platform and also nestle on each other, rings obtainable in any dimensions, ideal for handling parts to be machined; add as many rings as size of load demands; lift rings off as contents are removed.

For quotation give dimensions of rings, type of skid construction, and quantity of each wanted.

One to Two Weeks

When Ordering give item number to prevent error. All prices f.o.b. Detroit—subject to change without notice.

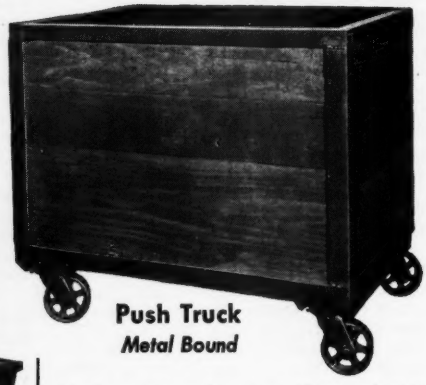


Inverted end angle.

Without end binding angle.

One piece binding angle. Heavy angle welded legs.

Item S-784 Standard Platform
Hardwood, metal armored, built to customers' specifications.



Push Truck
Metal Bound

May be used as a push truck or with lift truck. Built of all hardwood, completely metal bound, all welded construction, no bolts used. Four sturdy, 5" swivel casters.

TWO STANDARD SIZES

Item NS-418A $39.65
Measures 24" wide, 36" long, 26" high overall. Weight 185 lbs.

Item NS-418B $45.05
Measures 28" wide, 48" long, 30" high overall. Weight 260 lbs.

Wood Box
Metal Bound

This box has four-way lift truck entrance (side or ends). When ordering be sure to give underneath clearance required for your lift truck.

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Item NS-249A is 34" wide, 42" long, 20" deep overall box size. Add leg length for total height. Wt. 225 lbs.

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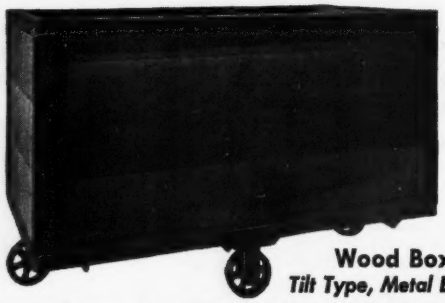
Item NS-249B is 34" wide, 48" long, 24" deep overall box size. Add leg length for total height. Wt. 300 lbs.

$36.05



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A general utility push truck, "Tilt-Type" for easy wheeling and short turning of corners. Two rigid and two swivel, 5" metal casters, ½" tilt.

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